Volume 93 Number 15

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

PRODUCERS of steel rails, with belts tightened after three lean years, grasp avidly at the government's proposal to finance the purchase of 1,089,746 tons of rails and fastenings for railroad rehabilitation. But in this tempting bait may be discerned a well-sharpened hook in the form of Railroad Co-ordinator Eastman's "opinion" that the price should be scaled down to below $35 a ton from the present $40 level (p. 17). Even at $35, rails would be priced below the level of ordinary carbon flat-rolled material. The above rail needs would postulate a production of 1,300,000 tons of steel ingots, sufficient, if spread over three months, to raise the steelmaking rate 8 points. Incidentally, a similar government sponsored program of freight-car buying is shaping up and price pressure may spread to this field.

Mills To Feel Pinch of Higher Fuel Costs

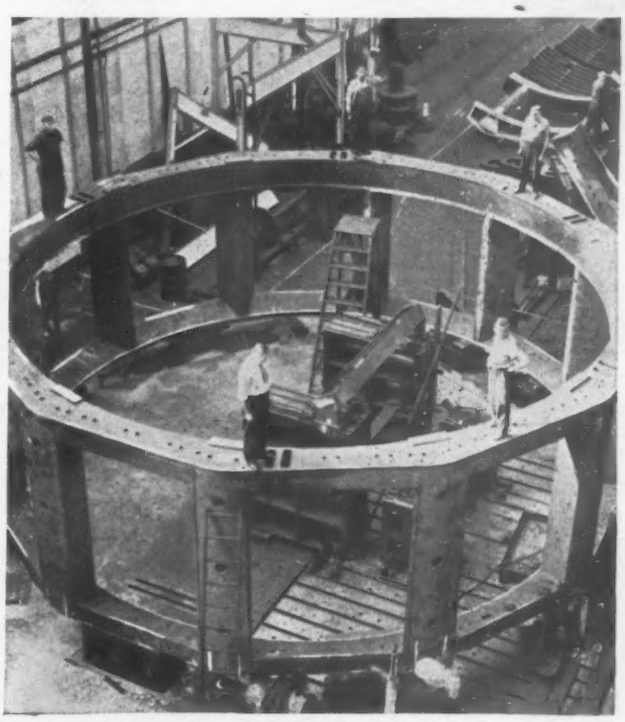
An 8-point rise in the operating rate would prove a stimulating tonic to steelmakers whose operations the past week staved off pressure for the first time in nearly two months, holding at 38 per cent (p. 15). This was accomplished by an increase in the rate at Pittsburgh to meet specifications against third quarter contracts, labor troubles notwithstanding. . . . Current strikes continue to show their most pronounced effect in fuel production, thus boring into the very base of the market structure (p. 53). Fuel prices, as a result of scarcity of supply and markups resulting from code price agreements, are appreciably higher. New business in steel is best characterized as flat, a normal condition at the turn of the quarter.

Production Slower, but Year's Totals Improve

Despite the fusillade of criticism directed at many of the national administration's tactics, apparently they have been successful in getting industry off dead center where it appeared to be stalled, a fact emphatically borne out as production statistics are compiled. Witness the fact that steel ingot production (p. 13), while declining 17 per cent in September from the August level, totaled for nine months some 4,300,000 tons more than for all of 1932. Pig iron production kept in step, the daily rate for September being 15 per cent lower than in August, although the nine-month total exceeded all of 1932 by about 1,000,000 tons (p. 14).

Mills Make Progress in Safety Work

Popular notions regarding the perils of working in a steel mill are given a rude jolt by the record of a Cleveland mill (p. 19) where only one injury was reported in 4,092,984 man-hours of operation. At present probably more danger is to be feared from strong-arm pickets and tear-gas laden deputies than from mill ma-



Steel to control "mighty waters": This 100-ton intake gate for Boulder dam has just been completed by Westinghouse Electric & Mfg. Co. It is 10 x 30 feet, reported largest welded structure ever made at the East Pittsburgh shops

chinery . . . . In Detroit, the tool and die makers' walkout, nicely timed for the season when model changes are in process, has stirred up serious labor discord (p. 16) beneath the surface in automobile plants. Production, however, continues apace, although the usual year-end tapering off has started. . . . . NRA administration is held partly to blame (p. 22) for present labor difficulties.

Metal Societies in Annual Roundup

Another National Metal Congress and Exposition, this year in Detroit, has been brought to a successful conclusion, with attendance (p. 11) topping earlier estimates. Technical sessions of four national societies and one local group (pp. 36, 38, 39, 42) filled meeting rooms at two hotels. Co-operating in display of materials and equipment (p. 44) were 135 exhibitors. . . . . Independent metal treating plants have effected a permanent organization (p. 12), approved a code of fair competition for submission to the NRA . . . . Code for the machine tool industry came up for hearing (p. 12) Oct. 2. Modifications were seen likely . . . . Hearing on the malleable iron code (p. 12) developed differences in opinion between large and small foundries on the matter of costs.

Obtaining Precision in Round Bar Stock

Accuracy of shape and high finish are advantages of round steel bars cold drawn, ground and polished. This material is used widely (p. 25) for all types of shafting; where greater accuracy in regard to straightness is required, turned and ground shafting, produced from hot-rolled bars, is recommended . . . . An electric-furnace metal that is cast readily and may be forged or rolled (p. 50) has been developed by an Ohio steelmaker . . . . Valves for high-pressure or high-temperature steam and oil lines are being made (p. 48) of steel containing up to 0.50 per cent carbon, 4-8 per cent chromium and 0.75 to 2.0 per cent tungsten.

New Era in Castings Signalized

Depression years have constituted the most interesting period in the American record of specification-making (p. 28), so far as steel castings are concerned. The era has been signalized by authoritative evidence of substantial progress made in steel founding; not only in making a worthier product from the common grades of steel, but also in producing dependable material from alloy steels . . . . Recent research (p. 39) has led to the conclusion that cast steel can be arc welded successfully to cast steel or hot-rolled low-carbon steel by means of bare or fluxed electrodes . . . . Not less than one-third of the power absorbed in wire drawing is wasted in friction, an authority on the subject (p. 42) maintains.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

Closed Shop Would Be Stupidity

To the Editor:

A statesman of Greece once said: "Against stupidity even the Gods have no defence."

At the moment, the defenses of the Open Shop seem to have been weakened by an act of Congress, but nevertheless if the steel industry of this country is obliged once more to bow to nationally organized labor, it will do so because of widespread stupidity.

Iron and steel have been made in the United States to some extent for more than a hundred years, but not until 30 years ago, when the industry shook off the union yoke, was it able to serve the public in a satisfactory way and obtain a position of general stability. Before that time a steel plant was known as a place where men worked long hours under dangerous conditions, and where employment was irregular. As a result of the companies being under-financed, the plants were poorly equipped and the product inferior in quality.

Immediately upon elimination of the "walking delegate" and union "business agent," a new era opened and the steel industry of this country rose to first place among the industries of the world. Conditions under which men worked were greatly improved, wages went up rapidly, employment became steadier, and the whole industry quickly became known as the best organized, best equipped and best financed of all industries.

I used to think, when I became a worker in a steel plant more than 40 years ago, that there was some justification for the union, but time, results and intimate acquaintance with both employes and employers have convinced me that the closed shop union works harm to all interested parties.

During the past 30 years the public has benefited enoromusly from reduced costs and lower selling prices of goods like steel and automobiles made in nonunion industrial plants. On the other hand, over the same period of time, the public has paid an enormous price in wages and economic disturbance to organized labor in "sheltered" industries like the building trades, transportation and governmental departments, both federal and local.

There seems to be a great concern in this country about the spread of racketeering, but it is well to keep in mind that the racket had its inception in the trade unions and that it is from this source that the racket has developed along other lines. Arson, intimidation, and murder have for 50 years been the chief reliance of organized labor, which fact supplies sufficient evidence that it can make no progress by other methods.

But even assuming that the methods of the unions are based on merit and lawful conduct instead of upon the strong arm, would the closed shop ever fit into any democratic society? I think not because in such a society industrial corporations are either operated by the state, or they operate under a state charter. Under these conditions it would not seem to be either ethical or legal for the management to restrict employment to one class of citizens.

Of course, I know that all conflict between the Open and Closed Shop would be automatically eliminated once all labor became unionized, but that condition would mean complete industrial and political control by the proletariat, the same as in Russia. Do we want that? Is that the intent of the N.I.R.A.?

JEROME R. GEORGE.

Marion, Mass.

Metal Week Activities Run High; Attendance Large

BENEFITED by the industrial upturn during recent months, the 1933 National Metal congress and exposition held in Detroit, Oct. 2-6, was the most successful since the depression took its toll. The show was far more complete, both as to number of exhibitors and variety of products, and the attendance was better than expectations.

The exposition required floor area more than 40 per cent in excess of the Buffalo show last year and exhibitors numbered 135, compared with 105. It was significant also that the attendance at both the show and congress was more widely spread geographically.

Participating in the week's congress of technical meetings were the American Society for Steel Treating, American Welding society, iron and steel and institute of metals divisions of the American Institute of Mining and Metallurgical Engineers, the Wire association, and American Society of Mechanical Engineers.

Steel Treaters Choose Officers

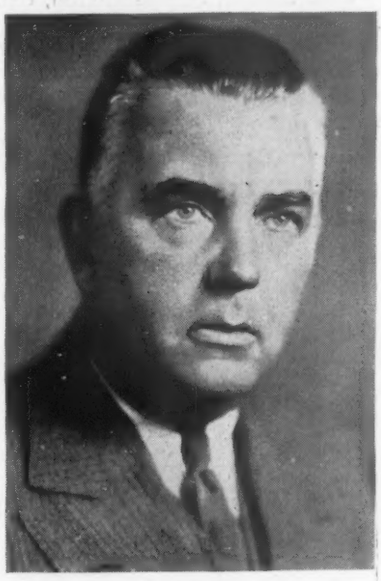
At the annual meeting of the American Society for Steel Treating, Oct. 4, it was announced that W. H. Phillips, vice president, Molybdenum Corp. of America, Pittsburgh, at present vice president, had been nominated for president. Nomination virtually assures election, therefore Mr. Phillips will assume office Jan. 1, 1934.

The nominee for vice president, to serve one year, is B. F. Shepherd, superintendent, rock drill division, Ingersoll-Rand Co., Phillipsburg, N. J. Emil Gathmann, president, Gathmann Engineering Co., Baltimore, was nominated for the office of treasurer for two years.

Nominated to serve as directors for two years were W. P. Woodside, vice president in charge of research, Climax Molybdenum Co., Detroit; and E. C. Bain, research laboratories, United States Steel Corp., Kearny, N. J. W. H. Eisenman, 7600 Euclid avenue, Cleveland, will continue as secretary.

Early this fall, members will vote upon a new name for the society, it being believed that the present name has fulfilled its usefulness and no longer adequately describes the organization's field of activity. Two names proposed by the board of directors, and upon which the vote will be taken, are American Metallurgical Society and American Society for Metals.

At the same time a vote will be taken on several amendments to the constitution dealing with the procedure for nominating and installing officers. For the purpose of making the action effective, a special meeting of the society will be held in Cleveland, Dec. 20.



W. H. PHILLIPS
Nominated for president of American Society for Steel Treating

Following the presentation of formal reports of the officers at the annual meeting, President W. B. Coleman, president, W. B. Coleman & Co., Philadelphia, presented the R. M. Bird bell and gavel to the Cleveland chapter. This award is made annually to the chapter making the most notable progress in the opinion of the president. Aided by educational courses, the Cleveland chapter increased its membership notably, and became the largest in the society.

The annual dinner was served on Oct. 5 and at this time the Henry Marion Howe gold medal, awarded annually for the best technical paper published in *Transactions*, was presented to J. V. Emmons, metallurgist, Cleveland Twist Drill Co., Cleveland. The paper, "Some Molybdenum High Speed Steels," was published in the March, 1933, *Transactions*.

A. H. d'Arcambal, sales manager of small tools, Pratt & Whitney Co., Hartford, Conn., was presented with the Past President's medal in recognition of his services as president in 1932.

Speeding Up Transportation

Principal speaker at the dinner was R. E. Zimmerman, vice president in charge of research and technology, United States Steel Corp., New York. He discussed the relation of metallurgy to the new era in transportation and predicted that within ten years new ideas in speed and comfort will have changed the standards of railroad, airplane and automobile travel drastically. Racing speeds attained recently in track competition by automobiles will be normal speeds on highways in this new era, he said.

135 *EXHIBITS AT METAL SHOW: General view of National Metal exposition in Convention Hall, Detroit, where last week throngs inspected latest developments relating to the processing and application of steel and nonferrous metals*
(*see also p.* 44)

Railroads and airplanes will be striving for greater travel comfort, as well as increased mileage per hour.

These developments, declared Mr. Zimmerman, will be made possible by the work of expert metallurgists who are called into consultation on every question involving alloys, new parts, or design. Hundreds of formulas, he said, are ready and waiting for the end of the depression, when the public will be in spending mood to avail itself of these new advantages of speed and comfort in travel. Probably the railroads with airplane and automobile competition will be next in line to avail themselves of the fruits of metallurgical research. Lightness in metals is the prevailing demand in transportation, and with lightness will come speed, he concluded.

Presents Campbell Lecture

The eighth annual Campbell Memorial lecture was presented on Oct. 4 at the conclusion of the annual meeting by H. J. French, International Nickel Co. Inc., New York. The subject of his lecture was "Fatigue and the Hardening of Steels."

During the week, the American Society for Steel Treating conducted nine technical sessions on a wide range of topics. Some of these sessions are reported on page 36 of this issue of STEEL.

The American Welding society conducted six technical sessions, including one dealing with fundamental research. Highlights of the early sessions are presented on page 39.

Four sessions were arranged by the two divisions of the American Institute of Mining and Metallurgical Engineers. At a joint dinner on Oct. 4, A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., presented a nontechnical address on silicon.

The Wire association extended its activities over four days with three technical sessions and its annual business meeting. Upon the latter occasion, Richard E. Brown, secretary of the association, tendered on behalf of *Wire and Wire Products* a medal to become an annual award for the best paper contributing to the betterment of the wire industry, processing machines and plant operators. Proceedings of the association are reported on page 42.

Evans Ward Heads Bolt Co.

Evans Ward has been appointed president of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., succeeding the late William L. Ward. He will also continue as general manager. Warren L. Ward has been appointed vice president.

Sees Billions for Capital Purchases

WASHINGTON

REHABILITATION of the capital goods industries is "the only medium for permanent expansion in consumer purchasing power," declared John W. O'Leary, president, the Machinery and Allied Products institute, at the machine tool industry code hearing in Washington, Oct. 2.

It would require $30,000,000,000 to replace equipment obsolete at the end of 1932 and make up deficiencies in purchasing during 1930-1932, compared with the average for 1919-1929, he maintained.

J. V. EMMONS

Awarded Henry Marion Howe gold medal of American Society for Steel Treating

In presenting the machine tool code, Ralph Flanders, chairman of the industry's code committee, said that "the only compensation small plants have for higher operating costs is slightly lower labor rates, which in turn are compensated for by lower living costs, and in formulating the code the condition of plants in small communities has been kept in mind."

The machine tool code provides an average work-week of 40 hours, with seasonal peaks of 48, with a minimum progressing wage rate of 40 cents an hour. Representatives of labor objected. Deputy Administrator Muir stated that certain parts of the article dealing with wages, including the merit clause, would have to be modified.

The hearing Oct. 2 on the malleable iron code developed a difference of opinion between large foundries and small foundries on the ascertainment of "fair and reasonable costs," it being maintained by the larger foundries that costs which would be equitable for the small ones would be high enough to induce large automotive users to undertake their own production of malleables.

An amendment to the malleable code proposed by the consumers' advisory board of NRA would prohibit any increase in the price of castings over the level of July 1, 1933, except in the degree that labor, material and other actual costs have increased.

P. R. Van Duyne, Meeker Foundry Co., Newark, N. J., proposed raising the weekly limitation of hours from 40 to 48 for malleable foundries with a rated capacity of 1500 tons or less.

Lawrence O'Keefe, president, International Molders union, proposed a maximum work-week of 35 hours, plus overtime for more than 8 hours a day, or 35 hours a week, and an hourly minimum of 45 instead of 40 cents.

A code for the railroad car building industry has been filed by W. C. Tabbert, secretary, American Railway Car institute, New York, calling for an hourly minimum of 40 cents and an average work-week of 40 hours.

Metal Treating Institute Completes Organization

Complete organization of the recently-established Metal Treating institute was effected in Detroit, Oct. 2-4, by representatives of commercial heat treating establishments in the United States. A large percentage of the industry was represented.

A code was submitted and approved and now is being prepared for submission in Washington.

Permanent officers were elected as follows: President, C. U. Scott, president, C. U. Scott & Son, Rockford, Ill.; vice president, Ralph Hoenscheid, president, Commercial Steel Treating Corp., Detroit; secretary, Arthur H. Nuesse, assistant secretary, Wesley Steel Treating Co., Milwaukee; and treasurer, W. S. Bidle, president, W. S. Bidle Co., Cleveland.

These officers with the following will constitute the board of trustees: A. D. Bach, president, New England Metallurgical Corp., South Boston, Mass.; Theodore Wiedemann, president, Wiedemann Machine Co., Philadelphia; Charles G. Heilman, president, Commonwealth Heat Treating Co., Detroit; Fred A. Snow, president, Fred A. Snow Co., Chicago; and A. M. Cox, president, Pittsburgh Commercial Heat Treating Co., Pittsburgh.

Labor Situation Tense, but Fuel Is Chiefly Affected

Bulletin

Washington—Late Friday, President Roosevelt called representatives of steel companies owning coal mines in western Pennsylvania for a conference at the White House Saturday. The purpose was said to be a solution of the problem as to how "captive" mines should be operated under the coal code.

PITTSBURGH

DESULTORY violence through last week broke the tense labor conditions affecting western Pennsylvania's two leading industries—steel and coal. Close to 90,000 strikers, the large majority being coal miners, remained away from their jobs.

Many of this number turned to striking-labor's chief offensive thus far—picketing. Weirton Steel Co.'s three West Virginia district mills remained closely picketed. Carnegie Steel's Clairton works likewise had a similar cordon thrown about it. Violence occurred at the Spang-Chalfant seamless tube mill at Ambridge, Pa., Oct. 4, in a pitched battle between pickets and employes.

At the Weirton, W. Va., plant, sheet, tin plate, strip and other finishing mills were down, open hearths were cold and the company's two blast furnaces remained banked, all since Sept. 27.

The same condition prevailed at the Clarksburg, W. Va., and Steubenville, O., mills of Weirton Steel. President John Williams of the company being in Wales, E. T. Weir, chairman of the board of parent National Steel Corp., directed the company's stand with some 10,000 employes whose actions had brought Weirton operations to a standstill.

Mr. Weir met with committees made up from among his own employes last week but refused to meet labor organizers or agitators not employes and who had entered Weirton for the express purpose of fomenting the strike. Supplementing a statement to strikers made earlier in the week, which explained that the Weirton Steel Co. was conforming to NRA and that workmen should return to their jobs, Mr. Weir said on Oct. 4:

"After conferences with committees of our employes, we are convinced that the strike in our mills was instigated and is being maintained by only a small percentage of our employes, and that the vast majority of them wish to return.

"The Weirton Steel Co. has made no change in its policy—it will make no contract with the Amalgamated Association of Iron, Steel and Tin Workers—and there is no such requirement in the steel code, NRA or the President's recovery program.

"We are co-operating in every way with the President's program for reemployment, and fulfilling our obligations under NRA and Steel code and we believe it our duty to open our mills and operate them with our own employes. You are not required to belong to any union.

"Notices will be posted of the time of returning to work."

The other important steel mill affected was the large by-product works at Clairton of Carnegie Steel Co. Picketing there started week before last and reached a peak by Saturday, Sept. 30, when some 5000 pickets paraded about the mill entrance.

Many of the second Sept. 30 shift of workmen at Clairton remained within the plant all week. Bunk houses, built within the plant to cope with the labor difficulties of 1919 and not used since, had been fitted up by Carnegie a month ago.

These were resorted to by workmen willing to work, yet fearful of violence if once they left the plant, and they would be unable to return. Clairton's one active blast furnace kept blowing through the week and operations at the by-product ovens were unaffected.

Several Pittsburgh steel mills took matters into their own hands, unwilling to permit rampant labor agitators to foment strained relations. Some 1000 employes of the Central Tube Co., also at troubled Ambridge, on coming to work the morning of Oct. 4 found signs posted on the entrance gates advising the plant was closing until conditions became more peaceful.

Wyckoff Drawn Steel Co. and H. H. Robertson Co., also both of Ambridge, made the same moves. In these three plants, 2000 workers were kept out. American Bridge Co.'s large fabricating plant there was not affected.

Difficulties at the Spang-Chalfant plant involved the most severe violence when pickets refused to disperse.

Three hundred special deputies were sworn in last week at Beaver Falls, Pa., to be kept in readiness for rumored trouble at the Babcock & Wilcox Co. plant there or at Pittsburgh Crucible Steel Co.'s plant at Midland, Pa.

Liggett Spring & Axle Co. and the Coshocton Iron Co., both of Monongahela, Pa., were closed Oct. 4 when a small number of employes at each plant walked out after 24 hours of picketing.

A further clash between deputies and picketing steel strikers occurred at the Spang-Chalfant plant late on Oct. 5. More than 20 were injured and over 100 shots were fired. Several tear gas bombs were thrown in order to clear the streets.

Offers To Pay $10 Penalty, But Strip Mill Is Virtuous

THE steel code has presented its perplexities, but a truly unusual case cropped up last week between a cold-rolled strip buyer and the supplying strip mill.

The buyer over many years' dealings had fallen into the quarterly contract class. Each quarter he had been entering his contract for 50,000 pounds of cold-rolled strip. He was a small user; rarely did he specify his entire 100 tons annually.

In the third quarter just passed this buyer came up to the Oct. 1 deadline having ordered out 30,000 pounds. Though the balance due him was some 20,000 pounds, nevertheless in the last week of September he asked his supplier to increase his contract to read, "120,000 pounds due."

To do so would be a violation of the steel code, replied the mill. So the strip user got out his pencil and started to figure. Up until Oct. 1 he had been paying 1.80c, Pittsburgh, for cold strip. Now, the price would be 2.40c. This was an advance of 60 cents per 100 pounds or $12 a ton.

His counter proposition came to the mill in the form of a request to violate the code willingly, absorb the $10 per ton penalty. Thus he would reimburse the mill for and still be ahead $2 per ton on his strip. The mill said no.

September Daily Ingot Rate 40.9%

PRODUCTION of steel ingots in September fell 17 per cent to a daily average of 88,884 gross tons from 107,430 tons in August, according to the American Iron and Steel institute. The rate of operation in September was 40.89 per cent of capacity, compared with 49.42 per cent in August.

Compared with 1932, figures for the first three quarters show well for the present year. The average

daily rate for nine months in 1933 was 74,698 tons, compared with 44,229 tons in the same period of 1932 and the per cent of capacity engaged was 34.36 for 1933 and 20.45 for 1932. Total production in 1933 to date is now well above that for the entire year, 1932.

Pig Iron Is Down; 9 Furnaces Out

MARKING the first recession in six months, production of coke pig iron in the United States in September dropped sharply. From the year's high point of 59,137 gross tons in August, the daily rate slipped off to 50,264 tons, a loss of 8873 tons, or 15 per cent. At the same time, operating blast furnaces were scaled down from 98 on Aug. 31 to 89 on Sept. 30.

The September rate fell back to a point midway between the 42,165 tons of June and 58,108 tons of July, and takes its place as the third highest for the year. In September, one year ago, iron was made at the rate of 19,788 tons per day.

Total production in September amounted to 1,507,931 tons, and a decline of 325,334 tons, or 17.7 per cent, from the 1,833,265 tons of the previous month. September, however, had one less day than August. Production in September, 1932, was 593,640 tons.

For nine months ended September, output aggregated 9,587,291 tons, against 6,856,487 tons in the corresponding period of 1932 and 15,008,033 tons in 1931.

Relating production to capacity, operations in the month just closed were 36.4 per cent, as compared with 42.8 per cent in August, 42.2 per cent in July and 30.6 per cent in June. In September, one year ago, the figure was only 14.0 per cent.

The 89 blast furnaces making iron in September compared with 98 on Aug. 31, 105 on July 31 and 89 on June 30. During the month 4 furnaces resumed operation and 13 were blown out or banked. Of the steelworks or nonmerchant class, 2 were blown in and 13 were blown out; of the merchant class, 2 were blown in and none blown out.

Furnaces resuming in September were: In Ohio: Jisco, Jackson Iron & Steel Co. In Pennsylvania: Brooke, E. & G. Brooke Iron Co.; Bethlehem G, Bethlehem Steel Co.; Duquesne No. 3, Carnegie Steel Co.

Stacks blown out or blanked were: In Ohio: Haselton No. 2, Republic Steel Corp.; Lorain Nos. 1 and 4, National Tube Co.; Youngstown D, Youngstown Sheet & Tube Co. In Pennsylvania: Bethlehem F, Bethlehem Steel Co.; Eliza No. 1 and Aliquippa No. 2, Jones & Laughlin Steel Corp.; Duquesne No. 5 and Isabella No. 2, Carnegie Steel Co. In Maryland: Maryland E, Bethlehem Steel Co. In West Virginia: Two Weirton, National Steel Corp. In Illinois: South Works Old No. 2, Illinois Steel Co.

AVERAGE DAILY PRODUCTION

	1933	1932	1931	1930
Jan.	18,348	31,336	55,337	91,573
Feb.	19,752	33,122	61,114	101,640
Mar.	17,484	31,194	65,448	104,930
Apr.	20,786	28,524	66,986	106,371
May	28,784	25,282	64,355	104,564
June	42,165	20,867	54,599	97,817
July	58,108	18,394	47,170	85,110
Aug.	59,137	17,035	41,264	81,455
Sept.	50,264	19,788	38,947	75,893
Oct.	.....	20,795	37,831	69,851
Nov.	.....	20,858	36,727	62,182
Dec.	.....	17,650	31,625	53,732
Av.	35,118	23,699	50,035	86,141

MONTHLY PIG IRON PRODUCTION

	1933	1932	1931
Jan.	568,785	971,437	1,715,443
Feb.	553,067	960,550	1,711,192
March	542,013	967,015	2,028,906
April	623,606	855,734	2,009,582
May	892,326	783,769	1,995,001
June	1,264,953	626,015	1,637,998
July	1,801,345	570,222	1,462,270
Aug.	1,833,265	528,105	1,279,205
Sept.	1,507,931	593,640	1,168,436
T'l 9 mo.	9,587,291	6,856,487	15,008,033
Oct.	.....	644,648	1,172,781
Nov.	.....	625,753	1,101,820
Dec.	.....	547,179	980,377
Total	.....	8,674,067	18,263,011

SEPTEMBER IRON PRODUCTION

	No. in blast last day of month Sept.	Aug.	Total tonnage Merchant	Nonmerchant
Ohio	23	26	77,456	348,187
Penna.	30	32	58,260*	416,591*
Alabama	8	8	71,395	37,197
Illinois	5	6	18,770	71,569
New York	8	8	39,787	62,583
Colorado	1	1		
Indiana	6	6	8,940	203,864
Maryland	3	4		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	884	92,448
West Va.	1	3		
Michigan	2	2		
Minnesota	0	0		
Missouri	0	0		
Total	89	98	275,492*	1,232,439*

*Includes ferro and spiegeleisen.

Steel Ingot Production — 1932-33

93.71 Per Cent of Industry Reporting
Gross Tons

1932	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	1,230,907	160,633	1,391,540	1,484,991	26	57,115	26.41
Feb.	1,230,970	157,067	1,388,037	1,481,252	25	59,250	27.40
Mar.	1,149,193	193,944	1,343,137	1,433,337	27	53,087	24.55
Apr.	1,036,163	144,197	1,180,360	1,259,629	26	48,447	22.40
May	950,838	103,593	1,054,431	1,125,243	26	43,279	20.01
June	755,068	100,249	855,317	912,757	26	35,106	16.23
July	653,039	102,916	755,955	806,722	25	32,269	14.92
Aug.	696,122	97,323	793,445	846,730	27	31,360	14.50
Sept.	804,470	124,970	929,440	991,858	26	38,148	17.64
9 mos.	8,506,770	1,184,892	9,691,662	10,342,520	234	44,229	20.45
Oct.	885,773	132,876	1,018,649	1,087,058	26	41,810	19.33
Nov.	838,419	128,844	967,263	1,032,221	26	39,701	18.36
Dec.	724,917	81,932	806,849	861,034	26	33,117	15.31
Total	10,955,879	1,528,544	12,484,423	13,322,833	312	42,701	19.75
1933		**96.57 Per Cent of Industry Reporting**					
Jan.	885,743	109,000	994,743	1,030,075	26	39,618	18.23
Feb.	922,806	126,781	1,049,587	1,086,867	24	45,286	20.83
Mar.	784,168	94,509	878,677	909,886	27	33,699	15.50
Apr.	1,180,893	135,217	1,316,110	1,362,856	25	54,514	25.08
May	1,716,482	216,841	1,933,323	2,001,991	27	74,148	34.11
June	2,211,657	296,765	2,508,422	2,597,517	26	99,904	45.96
July	2,738,083	355,836	3,093,919	3,203,810	25	128,152	58.95
Aug.	2,430,750	370,370	2,801,120	2,900,611	27	107,430	49.42
Sept.	1,990,242	240,473	2,231,715	2,310,982	26	88,884	40.89
9 mos.	14,861,824	1,945,792	16,807,616	17,404,595	233	74,698	34.36

Figures exclude crucible and electric ingots. Operating percentages for 1932 are based on 67,473,630 gross tons annual capacity as of Dec. 31, 1931; for 1933, on 67,386,130 gross tons annual capacity as of Dec. 31, 1932.

Adds Alloy Steel, Tie Plates

Improvements costing $250,000 at the Indiana Harbor, Ind., plant of the Youngstown Sheet & Tube Co., Youngstown, O., have been authorized and are to be started immediately, according to Frank Purnell, president.

Simultaneously it was announced that the company's new alloy steel department is now equipped to pro-

duce and deliver this product. Extension of the storage and shipping facilities of the bar and billet mills will complete the program of rounding out the plant, and further facilitate the handling of alloy business.

Other additions will include a new unit for rolling railroad tie plates, doubling the company's capacity for this product in anticipation of railroad requirements. The production of tie plates is also a new department recently established by the company.

Concessions Arouse Protests

Proposals of modification of resolution No. 13, providing for deductions in the all-rail Detroit delivered price on bars, small shapes, sheets and strip, are before the committee on commercial matters of the American Iron and Steel institute, of which S. E. Hackett is chairman. Competitors of Detroit manufacturers benefiting by these deductions charge the resolution is discriminatory.

It is possible that a revision of resolution No. 6, affecting products in indirect export, may also be considered. Further consideration of water rates is probable.

Steel Operations Unchanged at 38%

AGAIN of 8 points at Pittsburgh and 1 point at Youngstown neutralized losses at Buffalo and Wheeling and in New England, leaving the steel rate stationary last week at 38 per cent. In the seven preceding weeks the decline was continuous. Little change is indicated for this week, though additional capacity will be put on at Pittsburgh and in New England. Details for districts follow:

Pittsburgh

Heavy specifyig against expiring third quarter contracts, which must be shipped by Oct. 15, lifted the steel rate here 8 points last week to 38 per cent, and may put the rate above 40 this week. A leading producer operated through the week at 38 per cent. Three independents added four open hearths and averaged 45 per cent. Seventeen out of 53 steelworks blast furnaces are active here, Carnegie operating nine, Jones & Laughlin four, and Pittsburgh Steel, Pittsburgh Crucible, National Tube and American Steel & Wire one each.

Cleveland

Steelworks operations in the Cleveland-Lorain district averaged 54 per cent for the week ended Oct. 7, unchanged from the preceding week. Otis Steel Co., Cleveland, has all of its eight open hearths in operation; Corrigan, McKinney Steel Co. six of its 14; National Tube Co., Lorain, seven of its 12. Sheet mills here and in an adjacent lake district serving the Michigan automotive district are operating full, mainly to fill specifications on third quarter contracts by Oct. 15. Plate mills here now are working at 60 per cent, compared with 45 recently.

Chicago

Steelmaking operations were unchanged last week at 48 per cent, with indications pointing to a moderation rather than improvement on this rate this coming week. Blast furnace schedules also were steady, 10 of the district's 36 steelworks stacks being in blast.

Youngstown

Steel ingot output here last week rose a point to 55 per cent and was expected to go to 56 this week. Sharon Steel Hoop Co. is lighting another open hearth at Lowellville, O. Republic Steel Corp. is preparing to bring in a blast furnace at Lansingville, O. A few orders are being diverted to the valleys by steel strikes elsewhere.

Wheeling

The full effect of the strike in the Weirton Steel Co. plant was felt last week and steelmaking schedules declined 21 points from two weeks ago to average 35 per cent for the week. With the Weirton open hearths off and dropping of two more open hearths, one each at two other plants, only 12 of 37 open hearths were operating through the week. For this week, this district will continue to average 35 per cent unless open hearths resume at Weirton.

Buffalo

Steelmakers dropped enough capacity last week to lower the rate 19 points to 29 per cent, only 11 open hearths being on, compared with a peak of 23. The rate will be unchanged this week.

Eastern Pennsylvania

Steelmaking operations remained unchanged on the eastern seaboard last week at 31 to 32 per cent. Little variation is expected for this week.

New England

Steel production fluctuated between 70 and 75 per cent last week, compared with a rate of 75 per cent the week preceding. A sharp increase is expected this week, with producers in the district planning to add capacity, making the rate for the district over 90 per cent. One steelworks will operate at 100 per cent of capacity and another will be close to that rate.

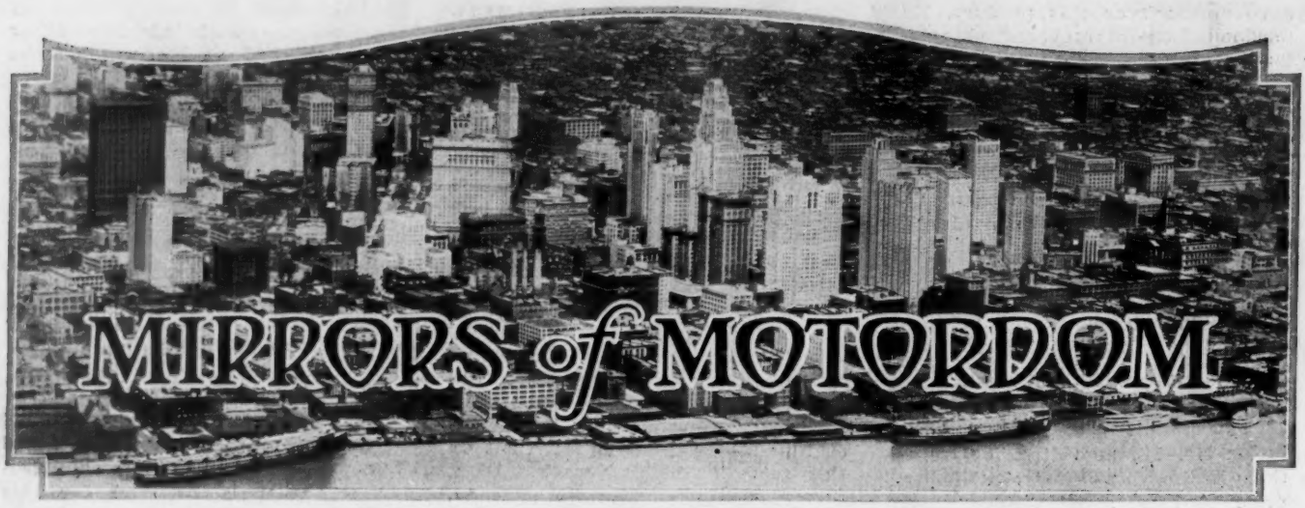
Birmingham

Open hearths active at Fairfield and Gadsden maintain this district's steel rate at 34 per cent. The Tennessee company's rail mill operated a few days last week but no open hearths were lighted.

Operating Rate of the Steel Industry, by Weeks

All figures except monthly open-hearth and bessemer totals of American Iron and Steel institute are percentages, based on reports from Pittsburgh, Chicago, Youngstown, eastern Pennsylvania, Cleveland, Birmingham, Buffalo, Wheeling, New England, St. Louis, Lorain, Detroit districts. STEEL's weekly estimates take into account only actual available capacity. Whether a week is the first or last of a month is determined by the month into which a majority of its days fall.

1932	1st Week	2nd Week	3rd Week	4th Week	5th Week	STEEL's Average	Institute's Monthly Total tons	Institute's Monthly Average
Jan.	22	25	26	27	28.5	25.7	1,484,991	26.41
Feb.	28.5	27	25	25	....	26.4	1,481,253	27.40
March	25	25.5	24.5	23	....	24.5	1,433,337	24.55
April	23	22	22	23	24	22.8	1,259,629	22.40
May	24	24	25.5	23	....	24.1	1,125,243	20.01
June	21	17	17	17	....	18.0	912,757	16.23
July	14.5	12	15.5	16.5	16.5	15.0	806,722	14.92
Aug.	14.5	14.5	15.5	14.5	....	14.7	846,730	14.50
Sept.	13.5	15.5	15	17	....	15.3	991,858	15.64
Oct.	18	19	19.5	19.5	19.5	19.1	1,087,058	19.33
Nov.	21	21	19	17.5	....	19.6	1,032,221	18.36
Dec.	16	15	14	12	13	14.0	861,034	15.31
1933								
Jan.	15.5	17	18	19	....	17.4	1,030,075	18.23
Feb.	19	19	19	17	....	18.5	1,086,867	20.83
March	15	13.5	15	14	15.5	14.6	909,886	15.50
April	17.5	20.5	25	29	....	23.0	1,362,856	25.08
May	33	36	40	43	....	38.0	2,001,991	34.11
June	47	48	49	51	54	49.8	2,597,517	45.96
July	55	57	57	55	....	55.8	3,203,810	58.95
August	54	54	51	48	45	50.6	2,900,611	49.42
Sept.	42	41	40	38	....	40.9	2,310,982	40.89
Oct.	38	..	..	..	....	....	.....	.....



Labor Situation Is Menacing
• • •
Streamline Hudson, Essex
• • •
Conservative Willys, If Any

DETROIT

FOR the third time in nine months Detroit feels that it is sitting on a volcano. Early last February, it will be recalled, the Briggs strike threatened to spread. Within a fortnight the banks closed, arousing the white collar as well as the laboring class. Now the tool and die makers' strike is making the city jumpy.

The timing of the strike is perfect. This is the season when tool and die shops are their busiest, in preparation for the new automobile models. Employment in production departments of automobile plants generally is tapering off, prior to the changeover in models, offering fertile ground for sympathetic action.

Beneath the surface a tremendous amount of discord has been fomented. Partly because the automobile industry succeeded in writing the merit clause into its code, the American Federation of Labor would rather organize Detroit than Pittsburgh. A number of radical groups are active.

Discounting a generous proportion of claims by employers, it appears a fair statement that the strike has been forced by a comparatively small element among tool and die workers. An encouraging percentage expressed its loyalty, but went out for fear of personal violence. One automobile manufacturer closed its department, for the safety of its loyal employes.

Friday was the deadline set by Cadillac, Chevrolet, Dodge, Fisher, Hudson, Packard, Plymouth and 38 independent tool and die shops for their workers to return to their posts or call for their tools. Work was resumed Friday morning at five shops. Efforts to adjust matters in Detroit developed the fact that strikers insist the Flint strike, first to be called, be settled first.

The strike has been without effect on production of automobiles. Almost without exception, October schedules are lower than September ones, and in the case of Ford a radical reduction in the last half of the month is indicated. If September assemblies held closely to 200,000 units, in comparison with 233,000 for August, October will be about a 150,000-unit month.

Nor has the strike thus far had a serious effect on new models. True, there has been ten days' delay on dies, but this slack can be readily taken up. Another week or ten days, however, and automobile executives will become concerned. Thus far the chief apprehension has been over the general labor situation.

HUDSON and Essex are undergoing a thorough redesign. While engine performance is being smoothed up, chief changes will be in bodies.

Unbiased opinion in Detroit is that the Terraplane eight is one of the two fastest cars offered in any price class. In 1934 the Terraplane body will be commensurate with the power plant.

Hudson also will be strikingly streamlined, with an entirely new front end, new and wider doors, and considerable distance toward the teardrop type of body traversed.

Terraplanes have been out after records the past summer, now holding more than 60. Every hill climbing record listed in the A.A.A. contest board record book except two—and those two have not yet been attempted—have been captured.

In a recent week seven records on California and Arizona mountain courses were smashed. Terraplane is proudest of having lowered the Pike's peak record, and of having won the second annual Portugese national race. Thus far in 1933 Hudson-Essex has added some 800 dealers.

Ford also has been reviving the old custom of taking down records, especially track speed contests. It has also conducted a number of runs calculated to prove that an eight is no more costly to operate than engines with fewer cylinders.

Willys refuses to throw up the sponge, its management seeking court approval for an expenditure of $437,000 for redesigning its passenger cars into more conservative models. Its $339 model has sold many cars although netting little profit. International Harvester, for whom Willys has been making a half-ton truck, is now manufacturing this model itself at its Springfield, Ill., plant.

One of the biggest surprises of the 1934 season will be a shift from a V eight to a straight eight engine by a line which has pushed the V type eight exclusively for a number of years. Its new engine, it is understood, will be a refinement of the most expensive series of another car made by the same manufacturer.

GENERAL MOTORS has a refrigerator tieup in Frigidaire. Chrysler is reported nearing a public affiliation with a Detroit line of electric refrigerators in which Walter P. Chrysler has been interested financially. This refrigerator line may also shortly push air conditioning equipment. A rumor of several years ago, not heard recently, was that Ford would manufacture a low-price electric unit to supply his dealers with a supplementary line. . . . The Ford industrial show in Detroit, shortly to be announced, will be one of the most pretentious efforts of its kind. . . If Ford goes to the new type of coil spring for all four wheels, as believed, this will be one of the most radical changes in Ford history, as the Ford adherence to the transverse type is proverbial. . . . The latest quip of the president of one of the leading low-price line is that for three years we have had order and no action, and now the problem is to maintain order with action. . . . The batting average of dealers in the low-price field is Chevrolet 10,000, Plymouth 7500, Ford 7000.

WINDOWS OF WASHINGTON

Eastman, Master Steel Buyer

• • •

Only Steel Spurns Lobbying

• • •

New PWA Setup Probable

WASHINGTON

RAILROAD Co-ordinator Eastman may be quiet spoken and shy and steeped in the lore of tariffs and differentials, but what a technique he has developed as the lord high purchasing agent for the railroads!

Dangling 844,525 tons of rails and 245,221 tons of fastenings before producers—a tonnage not assembled in years—he notes almost without guile that some roads stipulate they will buy only if rails are cut from $40 a ton to $35. He ventures the opinion that the price really should be below $35.

In advance he puts up his guard against the expected comeback that a reduction of $5 or more is prohibitive. If so, let mills open their books to government accountants and prove it.

The bottom price submitted by the four producers of rails he expects will make the market. Awards will be made on the basis of the lowest delivered price to each road, but other things being equal, the mill which breaks the present market the most will be favored.

And introducing the patriotic note, he hopes that producers will realize the emergency with which the country is confronted and the extent to which their compliance with an adjustment will contribute to the relief of that emergency.

A contribution of $5,000,000!

How even the hardest-boiled purchasing agent must envy such a setup: A million tons and patriotism and the authority of the United States government.

A dollar, even a quarter off the price of rails would have satisfied the vanity of many a purchasing agent and permtited him to say that he had chiseled the market, and Mr. Eastman starts off with $5!

This situation, in amplified form, was put up Wednesday to the United States Steel Corp., Bethlehem Steel Co., Inland Steel Co. and Colorado Fuel & Iron Co.

At the moment Mr. Eastman is silent on the price of fastenings, but a similar dose is being mixed up. Late Friday he proposed to accessory manufacturers that they get together and standardize, going so far as to suggest cross-licensing of patents.

Five standard weights for tee rails, each to be rolled in only one section, are being proposed and full agreement has been reached on the 112 and 131-pound weights. An effort will be made to persuade railroads to specify according to those new standards.

The equipment program, as a corollary of the track material program, still is incomplete.

THIS squeeze play on track material is further evidence of the great need for a steel lobby in Washington to represent the industry and gain an understanding if not a sympathetic degree of treatment of its problems.

A lobby, incidentally, is nothing opprobrious, and steel is the only major industry without one.

Such a lobby could have pointed out the inconsistency of bearing down on steel prices at this time. NRA is educating the public to paying higher prices on account of its codes; it concedes that the steel code has raised the industry's costs $100,000,000 a year. Manufactures of cotton and wheat are being taxed to provide a higher return to growers of those crops. But steel, with other heavy industries, must be depressed.

Few in Washington realize that rails are practically a specialty and almost a fabricated product. Few comprehend that rails are allocated on an entirely different basis than other iron and steel products. Even the President was unaware a month ago, when he started the campaign, that rails were reduced $3 a ton in 1932.

In proposing a price of $35 or less for rails it is doubtful even if many in the railroad administration compared this level with the current quotation of $35 at Pittsburgh and $36 at Chicago for carbon bars, $34 at Pittsburgh and $36 at Coatesville for tank plates, $39 at Pittsburgh for cold-finished bars, and so on. The comparison is even more striking considering that rails are quoted on a gross ton basis, and other products on a net ton.

There was an opportunity, too, for some one to point out that 1,089,746 tons of rails and fastenings means 1,300,000 tons of ingots must be poured, and for every ten poured the railroads get 5 tons of freight.

If the mills pare $5 per ton off rails and $3 off fastenings, as a "patriotic duty," it will cost them exactly $4,958,288, which would have maintained a $25,000 a year lobbyist with a $15,000 expense account 123 years.

In fact, it is interesting to speculate if early in the summer someone had "sold" the President on the importance of the steel industry to recovery. Could he have realized that steel is the great barometer, that its activity influences the stock market and general trade sentiment, possibly the railroad program would have materialized earlier and public works been pushed to put tonnage on the mills in the early fall and build up a fall upturn.

Only last week steel lost substantial tonnage in the Civilian Conservation Corps program. The matter of building barracks at the various cantonments was up. A Middle West fabricator had won important support for steel barracks of a portable type, which ultimately could have been placed in reserve for the army. Some 20,000 to 30,000 tons was involved in the one contract.

When lumber industry representatives learned that steel was boring in they got busy. Steel was without an official spokesman, and the result

was that lumber carried the day and received the largest single contract in the history of that industry.

The army is spending some $70,000,000 for housing. The slum elimination program is progressing with possibilities for steel. But not one person in Washington has the authority to speak for the industry.

BACK in Washington after his brief vacation at Hyde Park to think things over and his addresses in New York and Chicago, the President is embarking on the third phase of his campaign for recovery.

The first phase ended in June when congress adjourned after granting him almost unlimited power. The second came to a conclusion several weeks ago when it became patent, even to the administration, that General Johnson and Secretary Ickes have feet of clay.

Now, with business slowly sinking at a time when it should be flushed with a fall upturn and with a lowering congress rapidly coming on, the President may be expected to take a new tack.

It was typical of his amazing frankness and also probably indicative of his present thinking when, in his New York address, he referred to the "harder part still ahead." Three and a half months of NRA and PWA ballyhoo and the harder part still ahead!

That being the case and the President being candidly committed to the rule of trial and error in searching out a design for recovery, Secretary Ickes may be expected to join General Johnson out on the horizon.

Although over half of the $3,300,000,000 for public works has been allotted, comparatively few large projects are under way, and the season is approaching where outdoor work in the most populous half of the country is affected. NRA also is reaching the enforcement stage.

A report which has gained wide currency is that the federal trade commission will be reconstituted and NRA and PWA functions transferred there. It is even suggested that the RFC will receive wider power.

General Johnson, however, talks of adding four deputies to share his power, and visions industry on a self-governing basis, with three government representatives sitting on these boards.

Some of the President's advisers proposed that the RFC be used for administering the public works section of the recovery act, for the reason that it had a going personnel and the delays in setting up a new one would be avoided, but RFC has labored under the stigma of being Hoover-born. It is even housed in the building which Mr. Hoover used when he was secretary of commerce, was the charge.

Now sentiment is veering. Secretary Ickes, a progressive Republican and not a Democrat, has not shepherded the faithful into jobs. Postmaster General Farley thought he attended to that when he placed his right bower as the first assistant secretary, but even that ruse has not worked. The delay in getting public works money out has occasioned the greatest criticism yet of the administration, and a new deal appears certain.

The President, as a rule, acts with great tact. There will be no public admission of the failure of PWA, any more than there was of NRA, but just as General Johnson began fading from page one so Secretary Ickes is expected to give way imperceptibly to a new leadership. The next month should see some important changes in personnel in Washington.

As was the case with NRA, the verdict of failure for PWA is its inability to push projects and get men and materials at work promptly. A million men re-employed on public works projects by October, continuing for three years, was the objective.

How To Spend 3 Billions

AMONG novel schemes for obtaining a portion of the $3,300,000,000 public work fund is one to build a steel tower one mile high, containing 48 platforms each named after a state. There would be a runway so motorists could drive to the top. The promoter explained that not only would his project provide a vast number of man-years of employment and steel but would also solve the problem of surplus gasoline.

An engineer is urging the government to finance three high-speed belts, mounted on steel rollers, running from New York to San Francisco, the belts to travel at a minimum of 100 miles per hour.

Other proposals include the construction of a fleet of concrete battleships, a rocket ship capable of reaching the moon, a beach resort hotel miles from any water, and a jail which a western municipality assured would be self-liquidating.

INDUSTRY may think that labor is top dog with NRA, but there was a clamorous faction at the American Federation of Labor convention here last week that maintained that labor was not getting its share, and it required the tact and strength of conservative elements to hold it down.

William Green, president, was under fire because he permitted the merit clause to get into the automobile code. It was charged that the coal code softened the right to strike. A part of the metal trades section voiced its opposition to the organization of industry by so-called federal unions, that is by plants as a whole and not according to crafts.

Mr. Green, aided by the withdrawal of John L. Lewis, president of the United Mine workers and now "strong man" of the labor movement, emerged successfully, but not without many explanations. The determination to fight for a 30-hour week at the next session of congress was one gesture toward conciliation.

A resolution fathered by Michael Tighe, president of the Amalgamated Association of Iron, Steel and Tin Workers, proposed the formation of a labor party. Mr. Green predicting an eventual membership of 25,000,000 for the federation, the creation of a third party for labor and the seating of a walking delegate in the White House appeared logical conclusions.

One of the high spots of the federation convention was the dedication of the monument to Samuel Gompers, in a parking space near the federation's office building. Just when the statue was to be erected on the foundation, Washington union ironworkers voted for a 4-hour day to spread work. The refusal of the contractors to hire a second shift threatened to upset the program. Thus do jurisdictional fights harass even the federation.

The Roosevelt administration dispatched its heavy artillery to the convention to support Mr. Green's position and assure the federation that labor was not being discriminated against. General Johnson, who has not been speaking much in public recently, was included. So was Secretary of Labor Perkins. The administration is supporting Mr. Green for fear of having to work with some one even more radical.

Incidentally, Miss Perkins' aides are relating an incident of her visit to Pittsburgh district steel mills prior to the steel code hearing July 31. A vice president of a steel company received Miss Perkins and in simple language patently designed to enlighten a neophyte he explained some of the industry's problems. When she could get the floor, Miss Perkins broke in with questions indicating a thorough knowledge of the industry. The vice president, plainly surprised, asked where she had acquired her background.

"You may recall that when I was labor commissioner of New York I frequently visited the steel mill at Lackawanna," she rejoined.

The American Federation, at its convention, took a stand against inflation and any resumption of trading with Russia. But before the end of the year some credit operation is certain to be performed, opening the way to Russian business.

Safety Honors Awarded Corrigan, Republic, Pittsburgh Steel Products

CORRIGAN, McKINNEY STEEL CO., Cleveland, Republic Steel Corp., South Chicago, Ill., and Pittsburgh Steel Products Co., Allenport, Pa., received major awards at the twenty-second safety congress held at the Stevens hotel, Chicago, Oct. 2-6. These plants had the best safety records in the annual safety contest conducted by the metals section of the National Safety council from July 1, 1932, to June 30, 1933.

The Corrigan, McKinney plant operated 4,092,984 man hours with only one injury, the best record in group A of the steel mills division. The Great Lakes Steel Corp., Ecorse, Mich., and the Bethlehem Steel Co.'s Steelton plant took second and third honors, respectively, in this division.

The Midvale Co., Philadelphia, and the Hanna Furnace division of the Great Lakes Steel Corp. finished second and third, respectively, to the Republic Steel Corp. in group B and C, which covered operations of fewer hours than group A.

Leaders in Other Divisions

In the rolling, finishing and fabricating division the White Metal Mfg. Co., Hoboken, N. J., took first place, with the Buffalo and Steelton works of the Bethlehem Steel Co. finishing second and third. Mackintosh-Hemphill Co.'s Garrison plant, Pittsburgh, finished first in the iron foundries division, while the Haynes-Stellite Co., Kokomo, Ind., took first place in the steel foundries division and the C. Hager & Sons Hinge Mfg. Co., St. Louis, had the best record among the heavy machine shops plants.

Various papers were presented at sessions of the metals section during the convention. A resume of the year's activities was given by general chairman Robert L. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville. This report dealt largely with figures released several months ago showing a further decrease in injury rates in the metals industry during 1932.

Recommends English Language

F. M. Gillies, assistant general superintendent, Indiana Harbor mill, Inland Steel Co., Indiana Harbor, Ind., emphasized the importance of thorough instruction of workmen in correlating safety with plant operations in the steel mills. He recommended the teaching of the English language to those foreigners who have not mastered it, as an essential part of any safety program.

The mechanical control of dust was one of the subjects occupying considerable attention at one session at which E. O. Jones, consultant of the National Founders association, Chicago, was the principal speaker. Because of the lack of agreement among scientists as to the effects of certain types of dust, the industry has suffered at the hands of some members of the legal and medical profession who have attempted to capitalize on law suits to their own benefit, and control of dust at its source of origin was recommended as an important factor in promoting healthy working conditions for employes. Other speakers included P. A. Lovely, district safety supervisor, Pullman Co., St. Louis, who discussed "Safety in the Railway Car Industry," and Clayton E. Plummer, chemical and metallurgical department, Robert W. Hunt Co., Chicago.

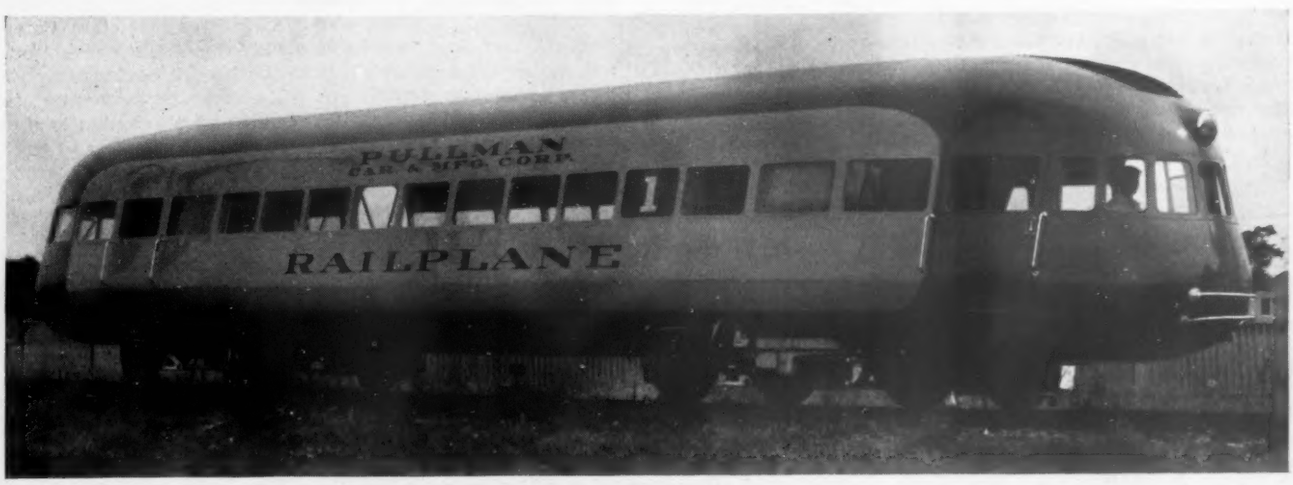
The latter, speaking before the chemical section of the safety congress, listed the following as the most common causes of failures of stainless steel equipment: Improper selection of stainless steel; improper selection during fabrication; failure to heat treat after welding; selection of too thin a gage of material; galvanic action resulting from dissimilar metals in contact in an electrolyte; mechanical failures.

Relatively few grinding wheel accidents are due to defective wheels, according to A. Rousseau, engineer, Worcester, Mass., speaking before the automotive and machine shop section. A basic understanding of fundamental rules for mounting and operating grinding wheels is important in their safe use. Suitable equipment in installation of grinding wheels also is important.

Sixty manufacturers of safety equipment were represented at the exposition held in connection with the safety congress. These exhibits included displays of the most modern types of safety appliances used in industry.

Fewer Steel Shareholders

Holders of common stock in the United States Steel Corp. as of Sept. 1 were 186,394, a decrease of 3175 from 189,569 holders as of June 1. The number as of Sept. 1, 1932, was 166,788. Holders of preferred stock in August entitled to the quarterly dividend were 62,952, compared with 63,517 on date of record in May and 63,199 in February.



LIGHT WEIGHT, SPEED, COMFORT FEATURE PULLMAN RAILPLANE: All welded steel and duralumin, this car is 60 feet long and weighs 25,000 pounds, compared with 130,000 pounds of a standard railroad passenger coach. It will carry 50 passengers at 90 miles an hour. Rubber is used liberally for cushioning and silencing; resilent wheels are employed, with rubber acting in shear. Two gasoline engines are mounted on the forward truck. The experimental car was built at the Stout Engineering Laboratories Inc., Detroit

Industrial Men in the Day's News

Thomas R. Mullen, Treasurer and General Manager, Lehigh Structural Steel Co.

LEAVING high school to begin life's work, he studied at night while applying himself to steel construction.

WITH a nationally-known firm of engineers in the war period, his ability became apparent to other builders.

A PLAN to purchase and operate a steel company led to long association with the man he now succeeds.

THOMAS R. MULLEN, who, as noted in STEEL recently, was elected treasurer and general manager of the Lehigh Structural Steel Co., Allentown, Pa., has risen rather rapidly in the steel industry, considering his difficult beginning.

Born in New York 40 years ago, he attended manual training high school in Brooklyn two years, when the death of his father made it necessary for him to go to work. While working he continued his studies at night schools to get the foundation for an engineering course.

His first contact with the steel industry was as clerk in the purchasing department of the Levering & Garrigues Co., New York, structural fabricator, which company later became a division of the McClintic-Marshall Corp., absorbed by Bethlehem Steel Corp. in 1931.

Early, he was shrewd enough to see that advancement in some well-established firms came mainly through resignations or deaths; hence when Levering & Garrigues started a general contracting department he saw the opportunity for getting started there. He served as timekeeper, and later as building superintendent on some of the firm's small general contracts. Here he made new contacts which were to lift him up the ladder.

In 1916 the Austin Co., general contractor and engineer, engaged him in its Philadelphia office, and after a short time he became district purchasing agent and assistant to the district superintendent. In this work he became an important cog in the construction of a number of large industrial developments, and in war emergency construction.

It was in 1919 that Robert L. Kift approached him with a suggestion that Mr. Mullen, Mr. Kift and William H. Mohr join in a plan to purchase and operate the Lehigh Valley Structural Steel Co., now the Lehigh Structural Steel Co. May, 1919, saw the organization launched, with Mr. Mullen as sales manager and later vice president in charge of sales and erection.

For 14 years the "three musketers"—Kift, Mohr and Mullen—carried on. Mr. Kift died last June 25, and in July the board of directors elected Mr. Mullen to his position as treasurer and general manager.

Mr. Mullen is a member of the board of governors, Camp Fire Club of America, an organization of big game hunters, and holds a commission in the United States army reserve, ordnance department. He likes to go fishing in his cruiser SEAGOIN, and in the fall and winter his leisure time is spent in target shooting with rifle, pistol and shotgun.

H. B. PEARSON, president, Compressed Industrial Gases Inc., Chicago, was elected president of the International Acetylene association at its annual convention held in Chicago, Sept. 26-29, succeeding E. J. Hayden, Linde Air Products Co., Chicago. Mr. Pearson served as vice president of the association during the past year. Philip Kearny, K-G Welding & Cutting Co., New York, was chosen vice president for the coming year. W. E. Cotter, New York, was re-elected treasurer, while H. F. Reinhard, also of New York, was re-elected secretary. New directors elected are: Clive Epperson, Keith Dunham Co., Chicago, who was chosen for a three-year term, and Elmer H. Smith, Smith Welding & Equipment Corp., Minneapolis, who was elected for a two-year term. W. C. Keeley Jr., National Carbide Corp., New York, and H. S. Smith, Prest-O-Lite Co. Inc., were re-elected directors for three-year terms.

□ □ □

Floyd G. Smith has been elected president of the Van Dorn Iron Works Co., Cleveland, succeeding Alfred J. Kroenke, who recently resigned from his position as president and general manager. Mr. Smith began with the company 29 years ago as a worker in the shops.

James T. Van Dorn, son of T. B. Van Dorn, who served as president of the company for some years, and is a grandson the late J. H. Van Dorn, founder of the company, has been appointed works manager.

□ □ □

R. M. Marshall has been appointed general manager, Sloss-Sheffield

Steel & Iron Co., Birmingham, Ala., succeeding H. A. Berg, who recently became president, Woodward Iron Co., Woodward, Ala. Mr. Marshall joined the company in October, 1932, as assistant to Mr. Berg.

□ □ □

R. F. Lincoln has been appointed assistant sales manager of the molding machine division, Osborn Mfg. Co., Cleveland.

□ □ □

C. H. Rose, assistant treasurer, Youngstown Sheet & Tube Co., Youngstown, O., has been elected by the board of directors to serve also as assistant secretary.

□ □ □

George W. Wagstaff has joined the alloy steel sales force of the Youngstown Sheet & Tube Co., and is located in the company's Chicago office. Mr. Wagstaff's experience with alloy steels covers a period of about 20 years.

□ □ □

E. F. "Gene" LeNoir has been appointed representative for the Louis Allis Co., Milwaukee, manufacturer of motors, with headquarters at Allentown, Pa. Mr. LeNoir has been associated with the industry 15 years and formerly was president of the Union Electric Mfg. Co.

□ □ □

T. F. Scannell, who for several years has been St. Louis representative for the Falk Corp., Milwaukee, has been appointed representative for the company at Dallas, Tex. He will have charge of oil field sales in Texas and Oklahoma and will be located at 1410 Magnolia building, Dallas.

Fitch S. Bosworth has taken over the company's St. Louis territory, for its entire line of products, with headquarters at 5475 Cabanne avenue, St. Louis.

□ □ □

D. Augsburger has been appointed manager in charge of the Duriron Co.'s Boston office, 1255 Little building, 80 Boylston street. He formerly was located at the company's plant and general offices in Dayton, O.

E. D. Brauns, who was in charge of the company's Boston office, has been transferred to Philadelphia, 1505 Race street. Mr. Brauns formerly was in the company's engineering department and general sales office in Dayton.

□ □ □

William O. Sheldon, for more than 11 years with the Yoder Co., Cleveland, has resigned and opened an office in the Society for Savings building, Cleveland, where he will handle several lines of plate and sheet metalworking machinery, including cold roll forming equipment, roll-type corrugated machines, power bending brakes, corrugated culvert rolls, squaring and rotary shears and kindred lines. Before coming to Cleveland Mr. Sheldon was engaged in this line of business in New York.

Died:

CHARLES PIEZ, who with Charles M. Schwab directed the wartime work of the Emergency Fleet Corp., and personal friend of President Franklin D. Roosevelt, in Garfield hospital, Washington, Oct. 2.

Mr. Piez was chairman of the board, Link-Belt Co., Chicago. He was a past president of the American Society of Mechanical Engineers. He served twice as president of the Illinois Manufacturers' association.

While pneumonia was the direct cause of his death, his health had been failing for the past five years, and since February, 1932, he had been wholly inactive in business. Last

Charles Piez

May he moved from Chicago to Washington, where he made his home.

Largely as a result of his fame as an organizer and manager of industry, Mr. Piez was selected in November, 1917, by Edward N. Hurley, then chairman of the United States Shipping board to be vice president and general manager of the Emergency Fleet Corp. Later he succeeded Mr. Schwab as director general.

Mr. Piez resigned May 1, 1929, to return to his former business. He continued as president of the Link-Belt Co. until 1924, when he became chairman of the board and remained as chief executive until February, 1932.

Mr. Piez served as president of the Commercial club of Chicago. His periods of service as president of the Illinois Manufacturers' association were from 1911 to 1913, and from 1924 to 1925. He was a director of Drexel State bank of Chicago; director, Illinois Bell Telephone Co.; and member of executive committee of the Museum of Science and Industry, founded by Julius Rosenwald. He received the honorary degree of doctor of commercial science, New York university.

He was a member of the following engineering societies: American Institute of Mining and Metallurgical Engineers, Society of Naval Architects and Marine Engineers, Western Society of Engineers, and Engineers' Society of Northeastern Pennsylvania.

Mr. Piez was instrumental in framing much of the labor legislation of Illinois, having been a member of the commission that drew the State Factory Act; was chairman of the workmen's compensation commission, and a member of the state arbitration board.

Born in Germany 67 years ago, of naturalized American parents, Mr. Piez received his technical education as a mining engineer at the School of Mines, Columbia university. His own earnings contributed largely to pay for his education.

Immediately after he was graduated in 1889 he entered the employ of the Link-Belt Engineering Co., in Philadelphia, as an engineer-draftsman. After he had attained to the position of chief engineer and general manager of the Philadelphia works of that concern, in 1906 he was elected president of a consolidated organization of the three related companies, the Link-Belt Machinery Co., Chicago, the Ewart Mfg. Co., Indianapolis, and the Link-Belt Engineering Co., Philadelphia.

Mr. Piez was a Mason and a Republican.

□ □ □

Charles E. Thompson, 63, president, Thompson Products Inc., Cleveland, manufacturer of valves for automobiles and airplanes, in Washington, Oct. 5. Mr. Thompson pioneered in the development of valves and was credited with being the first to make valves entirely of steel. In 1901 he and a group of associates founded the Electric Welding Products Co., Cleveland, specializing in welding automobile chassis and bicycle parts. He founded the Thompson Trophy Race, in which the fastest land planes compete annually.

□ □ □

Howard Beecher Tuttle, 70, chairman of the board, Eastern Malleable Iron Co., Naugatuck, Conn., Sept. 29, at his summer home, Middlebury, Conn. Mr. Tuttle also was chairman of the board of the Naugatuck National bank, and associated with other banks and industrial enterprises in the Naugatuck valley district. He was a graduate of Yale, 1887. His father, Bronson Beecher Tuttle, was founder of the Eastern Malleable Iron Co.

□ □ □

Elmer S. Williamson, superintendent of the American Construction Co., Cleveland, and formerly a well-

(*Please turn to Page 72*)

EDITORIAL

Present Strikes Are Harvest Of Seeds of Evasion

WHETHER the current labor strife develops into a more serious situation or gradually dies out, already it has caused too much unnecessary trouble and has demonstrated unmistakably a fundamental defect in the conception and administration of the national industry recovery act.

The original mistake was in phrasing Section 7a of the act, which deals with the principle of collective bargaining, so ambiguously that it is subject to numerous interpretations. General Johnson has grown hoarse reiterating that the wording "means just what it says", that it can be understood clearly by anyone, etc. Even President Roosevelt has intimated publicly that this part of the act is phrased clearly and that its meaning is self-evident.

Notwithstanding these authoritative guarantees of the elementary character of the labor relations clause, four months of experience with it have failed to evolve a clear-cut interpretation. In fact, as time went on and Section 7a still was a muddle to the majority, many observers began to credit the administration with a deliberate plot to hold the real and final interpretation in suspense as long as possible. To some, this seemed to be smart strategy; it kept employers and employes on pins and needles in alternate spasms of hopeful anticipation of a favorable decision and fear of an unfavorable one. Certainly General Johnson's attitude seemed to lend support to this theory of deliberate vacillation. At times one was led to suspect that he had a schedule which called for publicly chastising labor on Tuesdays and Thursdays and dressing down employers on Wednesdays and Fridays.

Failure To Place Early Construction Upon Labor Clause Responsible for Many Abuses

But whether the confusion over Section 7a is the result of well-intended strategy or of unforeseen accident, the fact remains that it has jeopardized the success of NRA more than any single factor. It has provided the loophole through which employers and employes have found an excuse for going to extremes to attain selfish aims. Few of the abuses which have been recorded in the past month could have happened under NIRA if its Section 7a had been written so that the average man could understand it. None of the costly and embarrassing retardation of the recovery program due to the labor clause would have occurred if General Johnson and his aides, soon after the recovery act was passed, had handed down a decision as to exactly how it was going to be construed by the administration.

Specifically, failure to declare the real intent of Section 7a had the effect of encouraging some union labor leaders and many radical agitators to broadcast malicious interpretations to hundreds of thousands of impressionable workers throughout industry. A popular practice among such organizers is to employ this argument when talking to employes:

"You will have to join our union because your company's representation plan will not be recognized under the NIRA. The law provides that when your company signs the code, your company will be compelled to recognize our union. When that time comes, you can keep your job only if you have become a member of our union. If you are not a member, you will have no standing and an acredited member will take your job."

Evasion of the Issue Encouraged Organizers To Adopt and Use Own Interpretations

This, of course, is contrary to the spirit of NRA, but the practice is understandable in view of the way in which the administration repeatedly evaded the issue. When the steel industry's attempt to clarify the question was ruled out of its code at the instance of NRA officials, the event was publicized as a great victory for the forces of organized labor. What was more natural than that organizers should grasp at this straw as an indication that President Roosevelt and General Johnson were giving them a signal to go ahead with their unionization work.

It is questionable whether the full blame for the strike trouble which now prevails can be justly thrown upon the shoulders of union and radical leaders. Undoubtedly they deserve censure for having exceeded the bounds of reason in some of their activities. However, history probably will decree that the trouble was due primarily to the mistakes of NRA administrators, who, thinking they could ride two horses successfully, found by experience that they had given so much rein to one of them that they could not hold it in check.

THE BUSINESS TREND

Business Still Held Back by Artificial Obstacles

UNUSUAL and artificial factors continue to cloud the business horizon. The strike situation remains menacing, with no definite indications as to whether it may develop into something more serious or may be calmed down to harmlessness. Codes and prices are causing buyers to proceed in unorthodox fashion. The government's attitude on monetary policy seems to be shifting more and more toward the sound money doctrines.

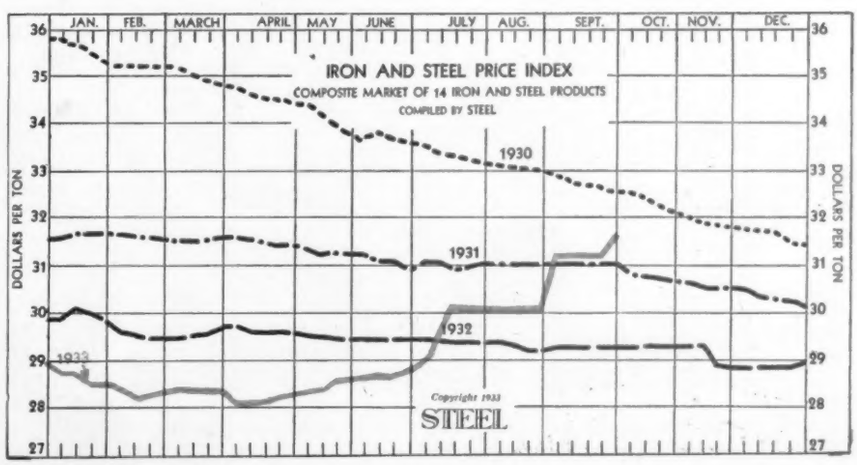
All of these factors influence business, yet their combined effect is confusing rather than clarifying. The weekly records of business reveal only moderate fluctuations within narrow ranges, which again emphasizes the lack of a definite objective.

Steelworks operations slipped downward to below the 40 per cent of capacity mark, due to the fact that fuel difficulties and direct strike trouble finally have reached the steel producing units. Car loadings continue their modest gains. According to the estimates of shippers' advisory boards, freight traffic in the final quarter will be about 15 per cent above that for the fourth quarter of 1932.

Outlook for industrial activity for the remainder of the year is uncertain. The public works program, which was expected to stimulate some of the heavy industries, is speeding up. However, some of the contracts for important projects embrace terms which are not very tempting to reputable contractors. While some of the work is resulting in good orders for material, manufacturers and producers still are not enthusiastic over the prospective benefits from this source.

Building and Equipment Industries Still Unmoved by Recovery Programs

Building awards have shown a rather sharp gain in value, but in terms of area, the contracts for August showed a decline from July. This important field of activity has resisted recovery more stubbornly than any other industry, with the possible exception of the heavy equipment industry. These and all other branches of the "capital goods" group must be revived before real national prosperity can be regained.

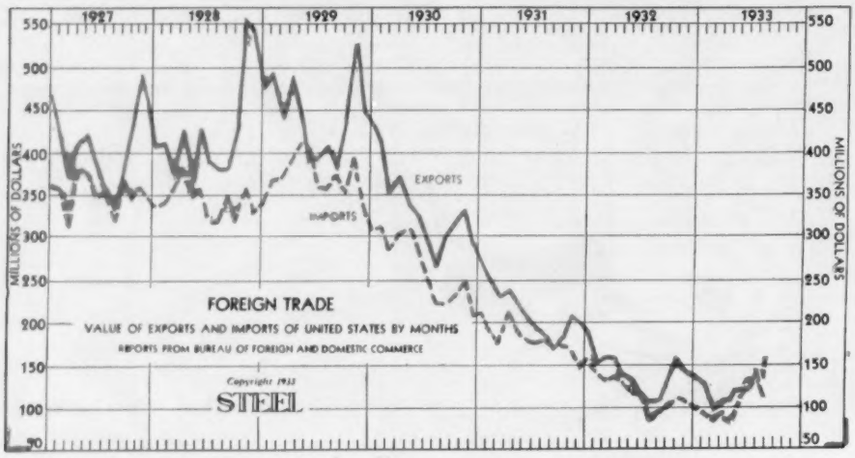


1933

Sept. 30 ..	$31.60
Sept. 23	31.23
Sept. 16	31.23
Sept. 9	31.23
Sept. 2	31.23

1932

Oct. 1	$29.32
Sept. 24	29.32
Sept. 17	29.32
Sept. 10	29.32
Sept. 3	29.32



Exports	
August, 1933	$131,000,000
July, 1933	144,194,000
August, 1932	108,599,000

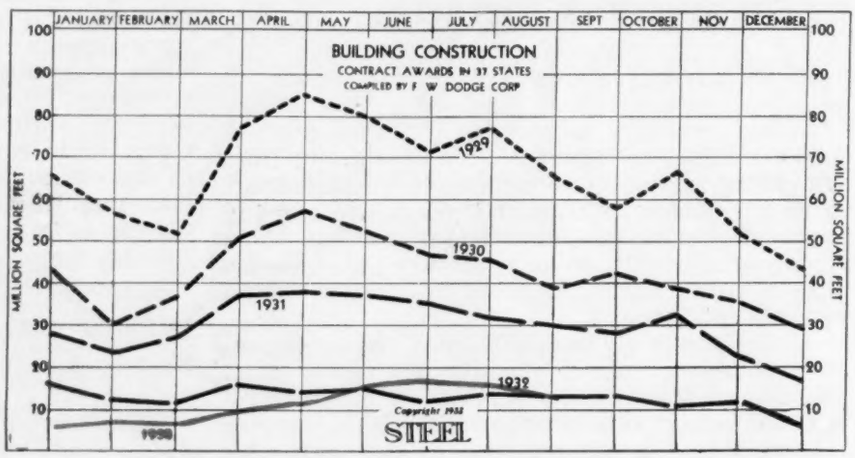
Imports	
August, 1933	$155,000,000
July, 1933	142,980,000
August, 1932	91,102,000

August Foreign Trade Results In Unfavorable Trade Balance

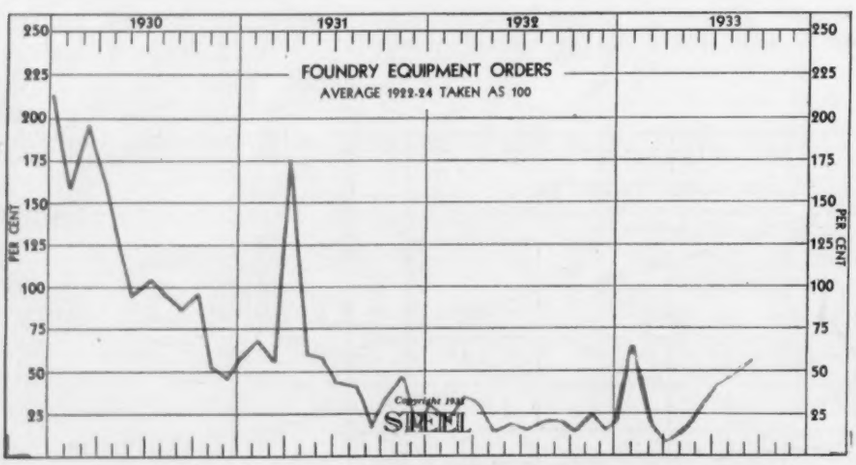
An unfavorable trade balance appears in the August report of this country's foreign merchandise trade. The total value of goods exported in August was $131,000,000 while imports advanced to $155,000,000, an excess of imports of $24,000,000. In July exports were $144,194,000 and imports $142,980,000. The reduction in exports in August, compared with July, was due to a reduction in cotton shipments in August. Both exports and imports in August, 1932 were exceptionally low in value.

August Building Awards Drop; Valuations Highest This Year

Building awards as measured in new floor space in 37 eastern states declined over a million and a half square feet during August. According to the latest reports of F. W. Dodge Corp., total construction for August involved 13,002,200 square feet compared with 14,605,600 in July and 13,863,500 square feet in August, 1932. However, the valuation of construction contracts in August at $106,131,100 did show a rise of about 28 per cent over July and was the largest monthly total thus far reported for 1933.



Square Feet	
August, 1933	13,002,200
July, 1933	14,605,600
August, 1932	13,863,500



Per Cent	
August, 1933	56.3
July, 1933	48.8
August, 1932	18.6

Foundry Equipment Orders Continue Upward Trend

Foundry equipment demand registered another sharp increase in August, according to the monthly report of the Foundry Equipment Manufacturers' association. The index for gross orders during the month was 56.3, which is the highest level reached since April, 1931, with the single exception of the brief spurt in January, 1933 when the index rose to 68.4. The index in August a year ago registered only 18.6. The shipment index at 49.7 compares with 38.3 in July and 29.8 in August, 1932.

FIG. 1—General view of the department in which round bars are ground, showing the method employed for supporting the work

PRODUCING PRECISION HOT-ROLLED AND COLD-DRAWN ROUND STEEL BARS

BY EDWARD S. HECK

NOT so long ago, the manufacturer about to place some new item of equipment in production was faced with the necessity of complete fabrication of every part from the raw product of foundry or steel mill. Today, the availability of semifinished products greatly simplifies the production problem in many lines of manufacture.

Indeed, the trend is so distinctly toward specialization that the preparation of goods for market by the final producer is approaching a condition of simply cutting to size and assembly. In many instances, the savings through specialization make such practice more economical than complete fabrication by the producer of the finished product.

At the front of the field in the offering of specialized, semifinished products is the steel industry. Sheets are available in practically any finish specified by users; wire may be had in more than 700 different cross-sectional shapes; bars are drawn in a variety of sections almost unbelievable to the layman. For example, the maker of a hinge can purchase bar stock drawn to the exact cross-section of his product, so that he need only cut-off, slot as required, and assemble.

Fig. 2—Some types of bars are turned in special machines in which the cutter gear rather than the work revolves

The Union Drawn Steel Co., Massillon, O., is well known for the variety of its product and precision of manufacturing methods. The production of turned and ground, and cold-drawn and ground, round steel bar stock is but one of the many items of finished bar stock produced by this organization.

The market for steel rounds finished to accurate specifications perhaps is larger than for any other particular item of bar stock. Uses extend all the way from elevator piston rods 57 feet long and held to 0.015-inch for straightness, to tiny shafts in high-speed, precision machinery. The cigar-wrapping machine illustrated in Fig. 4 is typical of one field of application for cold-drawn rounds, ground and polished for mechanical precision to aid assembly and increase operating effectiveness. Arrows point to various applications on the machine.

Applications of

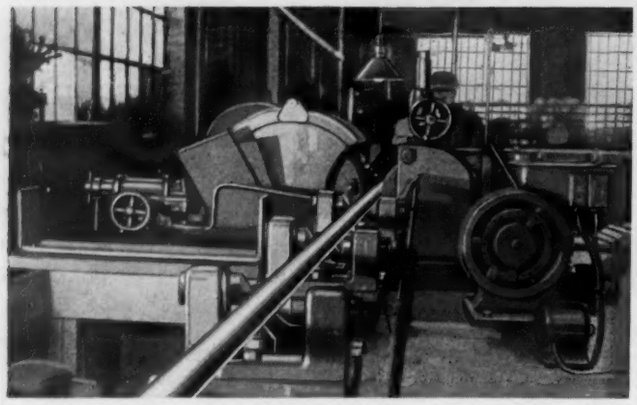


FIG. 3—One of the centerless grinders used in the production of ground shafting. Headstocks on the heavy-duty roll are belt driven

ground stock can be divided roughly into two classifications. In the first, the customer intends to perform machining operations on the bar, in which case the matter of internal stresses is quite important, particularly in large diameters, hence the bar is turned and ground. In the second classification are applications in which the increase in mechanical strength incident to cold-drawing is an asset. In this case the bars are cold drawn, then ground for improved accuracy, concentricity, and surface finish.

Advantages of turned bars over cold-drawn steel for many applications are well-known. Cold drawing increases the tensile strength and elastic limit which is an advantage from the standpoint of strength, but cold drawing also introduces certain stresses which may cause the bar to spring when machined for keyways, threaded for lead screws or finished for many other similar applications.

Accuracy and Finish

Another effect of cold drawing is to make the bar springy which causes it to resist mechanical straightening, making difficult the production of perfectly straight bars. The process of turning does not change the physical properties of the original hot-rolled bar. Turned and ground shafting can be held closer to perfectly straight than can cold-drawn bar.

Bars which first are cold drawn, then ground and polished, retain the advantage of improved strength, and have the features of geometrical accuracy and high finish. Cold-drawn and ground bars are supplied in sizes from ⅛ to 1 3/16-inch in diameter. Commercial size tolerance is exact size to minus 0.002-inch. On special requirements tolerance can be reduced to 0.0005-inch with a further reduction to 0.00025-inch if standard fractional sizes are specified. This stock is supplied in all grades of carbon or alloy steels.

Turned and ground shafting is produced in a range of sizes from ¾ to 8-inch. Commercial size tolerances are as follows: ¾ to 2 7/16-inch inclusive, plus 0.000 and minus 0.002-inch; sizes over 2 7/16-inch, plus 0.000 and minus 0.003-inch. Analysis to specification of customer.

In the production of turned and ground shafting from hot-rolled bars, the first step is a preliminary straightening to facilitate the work of the turning lathe. The bars are passed between two rolls, one on either side of the bar. Each roll rotates about an axis at an angle to the axis of the bar and the bar rotates as it is drawn between the rolls. The mechanical action is somewhat similar to that employed by the through-feed centerless grinder.

The shaft is taken from the straightening machine to the special lathe shown in Fig. 2. The lathes used for this work are special machines built by Union Drawn Steel Co. The cutting head revolves about the work rather than the reverse as in ordinary lathe practice. The shaft is forced into the revolving cutters.

Approximately 1/16 inch is turned from the diameter of the shaft, depending on its size. The stock is removed by two cutters; the first roughing and the second finishing, all in one pass. From the lathe the shaft again goes to straightening machines which in addition to straightening, burnish some of the irregularities remaining from the turning.

Centerless grinding on machines made by the Cincinnati Grinders Inc., Cincinnati, is the next step in production. The operation does not differ essentially from ordinary practice. As illustrated in Fig. 3, particular care must be taken in the support of the work to avoid whipping and mis-alignment.

Ground in One Pass

As the nature of the operation indicates, the through-feed method is used. Care with which the shaft has been turned and straightened, as well as its accuracy of support and adjustment of the machine, make possible the completion of grinding in one pass. Approximately 0.006-inch on the diameter is removed by the pass.

The grinding wheel is not particularly fine, 40-grit, fused alumina, vitrified bond being used. The wheel is 20 inches in diameter, 4-inch face in medium grade and runs at a peripheral speed approximating 6000 surface feet per minute. The work during the grinding operation is liberally flooded with grinding compound.

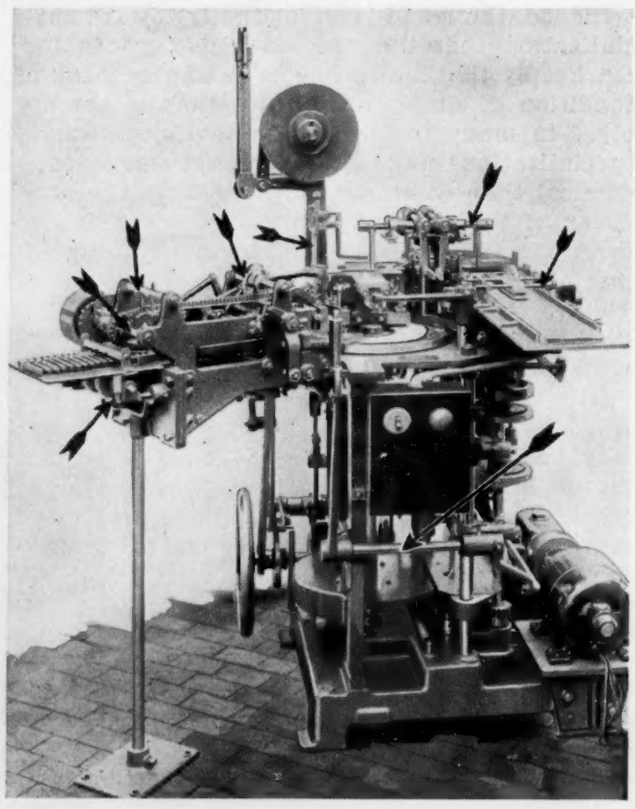


FIG. 4—A cigar wrapping machine is typical of many machines requiring a wide variety of ground bar parts

Inasmuch as the shafting must be supplied to the customer with a finish much higher than is usually the result of grinding with a free-cutting wheel in 40-grit, a burnishing operation follows the grinding. The burnishing rolls are similar to the straightening rolls previously described. Burnishing compresses the surface about 0.0004-inch and brings it to a bright finish. However, the working of the metal is not harsh enough to alter the physical properties of the steel.

Inspection and gaging of the bars is an important and a costly part of the work as most orders are sold on rigid specifications. Inspection for surface defects is shown in Fig. 5. In addition to the inspection shown, bars are placed on alignment racks and tested along the entire length with indicator dials for straightness. Delicate work on a straightening press sometimes is necessary to correct minute variations, as the shafts may be put in service where any variation in straightness or accuracy would produce serious wear on bearings or vibration.

Grinding Cold-drawn Shafting

The centerless grinding machines are used for work up to 4 inches in diameter. Shafts in diameters up to 8 inches and in comparatively short lengths are centered and ground on a plain cylindrical grinding machine also supplied by Cincinnati Grinders Inc. Usually two passes are required on rounds in the larger diameters.

Cold-drawn shafting in diameters from ⅛-inch to 1 3/16-inch goes directly from the straightening machines to the centerless grinders without a turning operation when the service for which they are designed does not call for a turned shaft. As a general rule, they are drawn 0.004 to 0.006-inch oversize which permits of grinding in one pass to the limits required. The accuracy of the cold-drawing process together with the straightening operation allows one pass to clean up the surface. As was the case with the turned and ground shafting, the grinding is followed by a burnishing which produces a mirror finish on the surface.

Roller Chain Information Compiled in Catalog

Complete information on applications for roller chain; methods of selecting proper sizes and sprockets; calculation formulas and tables for determining chain length; 60 pages of tables giving complete data on chains of various pitches, single and multiple strand; and sprocket data for all pitches of chain are contained in catalog 583, recently published by the Diamond Chain & Mfg. Co., Indianapolis.

A section of the 96-page catalog is devoted to special chains with side lugs and extended p'ns for conveying systems, and to chains of special materials such as stainless steel, bronze, aluminum, monel metal and the like.

A. F. A. Publishes Data on Dust, and Power Costs

American Foundrymen's association, 222 West Adams street, Chicago, has published in pamphlet form three papers presented at a "good housekeeping" conference held during the annual meeting of the association in June. The papers deal with dust abatement and control in foundries and are, by title: "The Dust Problem in the Foundry Industry," by Dr. E. G. Meiter, director of industrial hygiene laboratory, Employers Mutual Liability Insurance Co., Milwaukee; "Legal Aspects and Employer Responsibility," by Alfred C. Hirth, Williams Eversman & Morgan, Toledo, O.; and "Keeping a Clean and Orderly Foundry," by A. D. Lynch, personnel director, Ohio Brass Co., Mansfield, O. Copies are available for 50 cents each.

The association also has published a report on the conference on "Electric Power Costs in the Foundry" which was held at the recent convention in Chicago. The report may be secured through the association for $1.00.

The electric power costs committee is as follows: W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, chairman; R. D. Brizzolara, American Steel Foundries, Chicago; C. S. Anderson, Belle City Malleable Iron Co., Racine, Wis.; W. R. Jennings, Frank Foundries Corp., Moline, Ill.; James R. Allen, International Harvester Co., Chicago; and James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

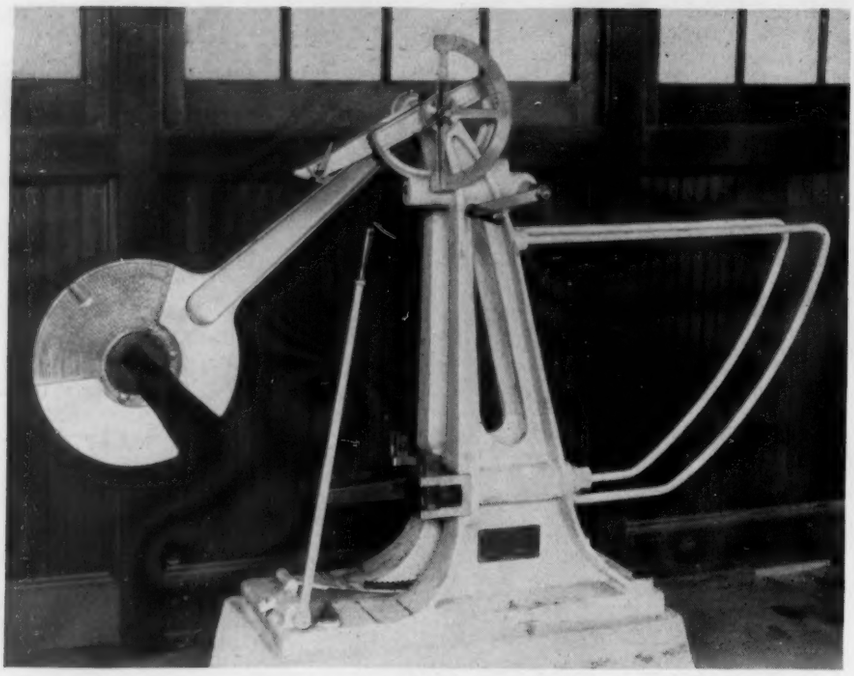
Polymerization Increases Film Strength of Oils

A new seres of industrial lubricants having high film strength due to a special polymerization treatment recently has been announced by the research staff of E. F. Houghton & Co., Philadelphia.

The new products, known as Sta-Put lubricants, are made of pure mineral oil which is polymerized under carefully controlled heat and pressure. This treatment is claimed to result in complete re-arrangement of the molecules of the oil without any change in its chemical content, thus producing a much closer bond between all of the molecules and a consequent increase in film strength.

The lubricants are made in three series. The 300 series are liquid, ranging in consistency from light machine oils for high-speed spindles to heavy oils for slow moving bearings and extremely high loads. The 400 series are made especially for gear lubrication. The 500 series, of grease consistency, are for screw-down grease cups, automatic grease lubrication systems and the like.

Fig. 5—Each ground bar is inspected carefully to make certain that it meets the close tolerances specified



Charpy impact testing machine in the laboratory of a steel foundry

Recent Progress in Drafting A.S.T.M. Specifications For Steel Castings

BY R. A. BULL*

THE test methods, which were mentioned last week in the first installment of this article, are those which are applied during manufacture to greater or less extent for determining whether the steel founder fulfills his quality guarantees. This class of tests does not include certain laboratory procedures that require considerable time for obtaining test data. Occasionally fatigue test values are ascertained on cast steel specimens. While this information very usefully indicates resistance to many alternations of tension and compression stresses, the test, which has not been effectively standardized, is among those somewhat poorly adapted for demonstrating adherence to specification requirements, because of the time needed to make a determination. Other tests unadapted for routine specification use for a similar reason are those employed to determine resistance to corrosion and abrasion, lacking standardization; and the prolonged test for ascertaining resistance to creep caused by high temperature, tentatively standardized in June, 1933 by the Testing society. While most of the currently used test methods that require considerable time are extremely valuable for the selection of varieties of cast alloy steels for extraordinary service, they are not feasible to include in regular specification requirements.

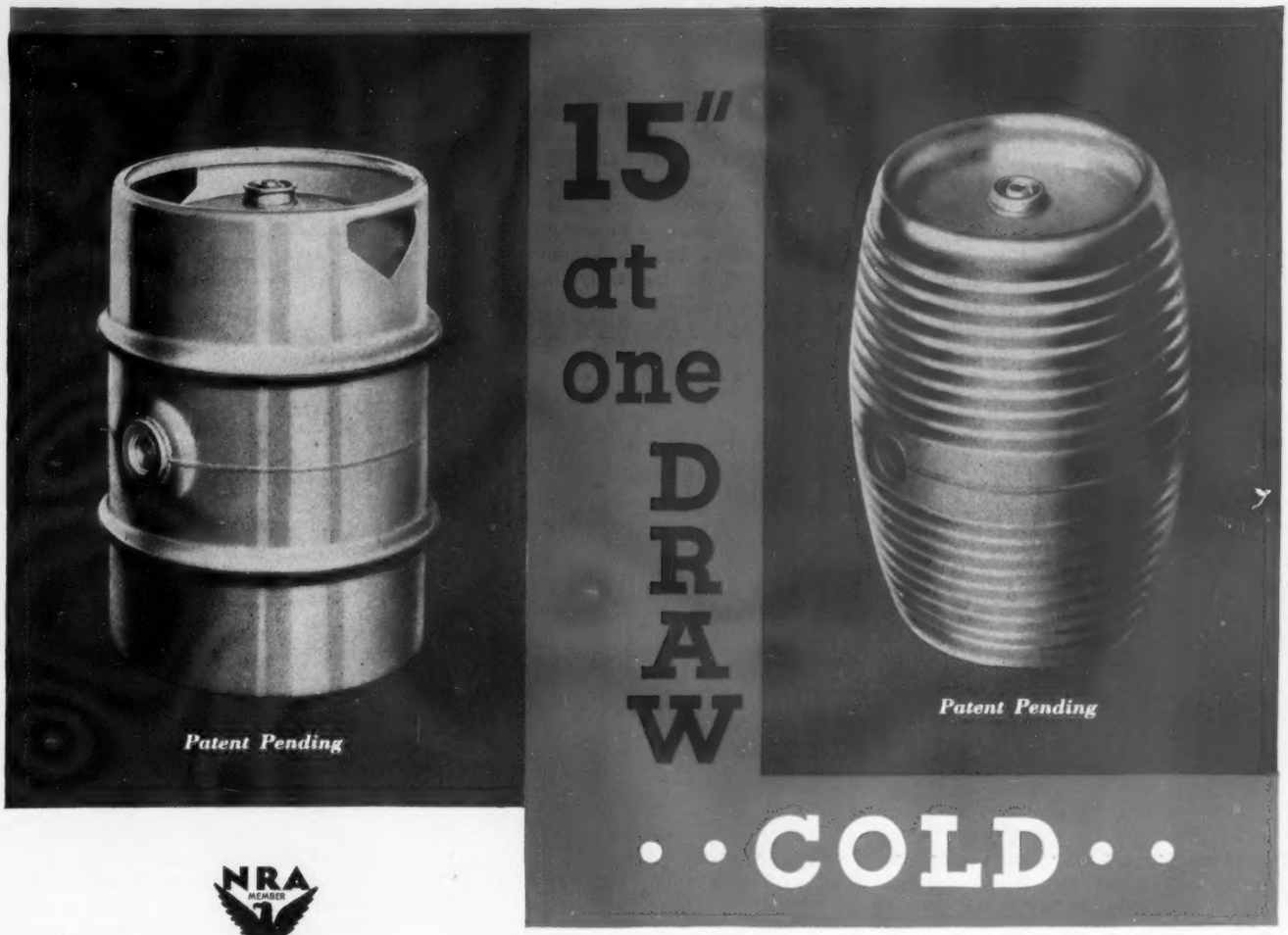
A point that may have occurred to the buyer, supplementing his conviction that the tension test does not tell the whole story, relates to the selection of heat treatment according to the design of the steel casting. Such treatment may influence impact and hardness test values more than tensile values, depending on the nature of the composition and of the heat treatment. It has already been indicated that the U. S. Navy regulates the nature of the cooling procedure by the weight of the piece or more strictly perhaps, by cross-sectional dimension and intricacy of shape. Probably some generally held opinions regarding difficulties arising from relatively quick cooling are the result of such cooling done in an unskillful manner. Perhaps the passage of time, accompanied by satisfactory field performance of air-cooled and liquid-cooled steel castings that are neither very simple in shape nor characterized by relatively small member-thicknesses may cause changes of opinion that will result in the fairly or very rapid cooling of certain steel castings in a way to effect important economies.

These comments regarding accelerated cooling would be incomplete, and might deceptively indicate the convictions held by the writer and many other steel foundrymen, without plainly stating that permission to liquid-quench heavy, intricate castings should never be granted, except when the buyer is assured that the producer skillfully and intelligently applies liquid quenching practices.

Nowadays a considerable tonnage-proportion of alloy steels is applied outside of the exclusively structural fields. There are numerous applications where effective resistance to tension, compression, or shear (one or more of these stresses, imposed steadily, repeatedly, or suddenly) should be accompanied by significant resistance to heat, or corrosion, or abrasion, and often to corrosion and heat, simultaneously involved. When resistance to corrosive agencies and/or to deformation caused by high temperature is a factor of importance, chemical composition becomes justifiable as a detail covered in the buyer's specification. The title of Tentative Specifications A148-33T indicates that they are not intended to cover fully conditions in such structural applications as happen to be associated with destructive agencies not related to customary physical tests made quickly to determine acceptability.

The ability of the experienced alloy steel foundryman to produce satisfactory material appreciably higher in tensile strength than 150,000 pounds per square inch should not be questioned as the result of including no grade of greater tensile strength than the highest covered in A. S. T. M. Tentative Specifications A148-33T. There are a number of well known producers of steel castings who have made considerable tonnages of metal having tensile strengths as high as 225,000 pounds per square inch. Naturally such material is characterized by relatively low degrees of ductility, as compared with metal having approximately 100,000 pounds tensile strength, now often produced. These very high strength cast steels are needed only for a minority of applications, the number of which has not yet justi-

*Major Bull is consultant on steel castings, 541 Diversey Parkway, Chicago.



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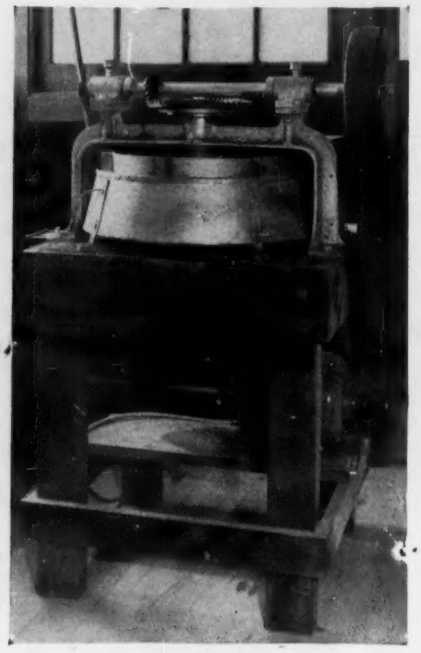
fied prescribed values in A. S. T. M. specifications. It is to be remembered that the procedure of the Testing society is to maintain new specifications as tentative for a reasonable period, pending trial and developments that may justify revision before the specifications are advanced to a standard status. By the time the new tentative specifications for alloy steel castings for structural purposes are considered in present or modified form to be suitable for adoption as standard, there may be additional grades of steel covered. In due course other physical tests may be prescribed. Undoubtedly such inclusion will be partly contingent on progress in test-standardization. Meanwhile the individual purchaser may apply his preferred standards of shock and wear resistance, also the bend test for ductility if he wishes to impose physical test restrictions in addition to those now contained in the alloy steel specifications.

Liquid Quenched Castings

In fairness to some steel foundrymen who have provided themselves with equipment and personnel for doing an exceptionally good job of liquid quenching, this discussion should include reference to the fact that plain carbon steel, cast from patterns having both thick and thin members, in pieces of considerable weight, has given satisfactory service after liquid quenching; also after meeting requirements collectively comparable with those prescribed for Grade 1 of Class B, Table II.

Something should be said not only regarding skillful heat treatment but other details of foundry practice that cannot satisfactorily be included in A. S. T. M. specifications. The latter necessarily are designed generally to cover very broad fields of application. Furthermore, it is to be remembered that all such specifications as are promulgated by the Testing society are intended to assure the presence only of properties ascertained after the material is made, not according to extraordinary measures for obtaining high quality, but according to customary practices usually admitted to be proper and feasible, considered in relation to the prices normally asked for the commodity. It is only when a specification obviously has peculiar significance shown by its title or phraseology that it should be assumed to indicate the result of production by means of technique or mechanical facilities of extraordinary character.

Unfortunately, although naturally, the length of time required for developing the new specifications for alloy steel castings caused some purchasers to issue private specifications for steel castings for structural purposes. There is no doubt that a few such specifications are defective metallurgically. It is to be hoped not only that the delay in action taken by the Testing society will be correctly understood, but that the society's tentative specifications for cast alloy structural steels will be generally regarded as representing an authoritative consensus of opinion of qualified producers and consumers who cooperated heartily in a prolonged effort to develop agreement that would be perfectly fair to all concerned, and would justify wide acceptance.



Abrasion testing machine in steel foundry laboratory

The latest evidence given by the Testing society regarding improvements effected in making carbon steel castings is found in "Tentative Specifications A154-33T, for Carbon Steel Castings for Industrial, Railroad, and Marine Uses." These purchase requirements were tentatively adopted Aug. 16, 1933, by the A. S. T. M., through action taken by its committee on standards. This was in accordance with the society's regulation authorizing the said committee to tentatively adopt new specifications, when such adoption delayed for a convention vote would probably handicap consumers and producers.

Formulation of new specifications was not contemplated in 1930 when the sectional committee that developed them was organized. Originally this group of 10 men was requested to study the confusing lack of uniformity prevailing in four sets of A. S. T. M. specifications for carbon steel castings, and to recommend ultimately such revisions as would probably harmonize the major requirements without departing from the policy of having such special purchase requirements as may be needed for certain applications.

It so happened, before the sectional committee had spent much time on the problem, that the latter became considerably involved through clearly manifested dissatisfaction with physical requirements in Specifications A27-24 and A87-27, particularly th latter. The former have borne th broad title "Standard Specification for Carbon Steel Castings," but the clause defining their scope explains that they apply to castings for general service and for ships. The other specifications referred to are officially termed "Standard Specifications for Carbon Steel Castings for Railroads."

As the result of United States government requirements, during the World war the A. S. T. M. developed "Tentative Specifications for Electric Cast-Steel Stud-Link Anchor Chain," now bearing the numerical designation A77-28T. These specifications never have included tension tests, and call for proof and breaking tests of special nature. They have been revised periodically, but were never standardized. It now seems probable that these specifications may be withdrawn before long.

The remaining set of specifications that had been adopted by the A. S. T. M. before the sectional committee began its study was mentioned earlier in this chronological explanation, and now bears the title "Standard Specifications A95-29, for Carbon Steel Castings for Valves, Flanges, and Fittings for High Temperature Service."

The custom in the producing and consuming industries concerned has been to refer to the four sets of purchase requirements for carbon steel castings as the miscellaneous, railroad, valve, and chain specifications.

Railroads Dissatisfied

Chief among the consumers who had expressed particular dissatisfaction with physical requirements in the oldest specifications were some railroad engineers. The required values in A. S. T. M. Specifications A87-27 had formed the basis for specifications issued by the American Railway association, and separately thereafter by many railway systems. These railroad specifications were first tentatively adopted by the Testing society in 1922, partly as the result of much work done under the auspices of a joint committee representing the A.S.T.M. and A.R.A., begun during the early days of the World war. The committee's particular inquiry, involving a comprehensive, scientific investigation, was for the purpose of ascertaining typical values for elastic limit, and ratios of elasticity to other properties in the grades of carbon cast steel used

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for rolling stock. The research finally disclosed the fact that the true elastic limit of cast steel was not accurately determinable by any known method. The same condition of obscurity obtains today. Dependence was placed chiefly on yield point and ductility values by the railroads. Their jointly adopted specifications have excluded tensile strength values as a requirement, except for the purpose of determining by the use of formulae the proper percentages of elongation in 2 inches and of reduction of area. However, these specifications have prescribed minimum percentages for these ductility indications which the offered material must show, beside meeting the formula requirements.

By the end of 1932 most of the railroad engineers had decided that exclusion of minimum requirements for tensile strength was unwise. This new point of view was highly important because it was that of the largest consuming group. During a cycle of representative years the railroads probably consume about one-third of the tonnage of carbon steel castings made in the United States. A. R. A. committees were given the responsibility of making detailed inquiry into the combinations of the four tension test properties obtained in current manufacturing practice.

Perhaps the conditions that result in differences of quality, metallurgically and otherwise, will become even more significant than they have been, as steel foundrymen collectively continue to make progress. Without making a careful census it would be impossible to state definitely the number of plants in the United States now producing steel castings. The depression has left its mark here as elsewhere. But probably there are more than 200 steel foundries now operating, and others which will again produce steel castings when industrial demand revives.

Faced Important Task

Considering the fact that mechanical equipment and supervising personnel are enormous factors in an industry having so many separately controlled units, and dependent on workmen to an extent roughly representing about half the total production cost, it is inevitable that there should be numerous standards of quality individually regarded as acceptable in the producing foundries. Many of these have regularly or occasionally made important tonnages of railroad castings. Thus, the problem facing railway engineers of tests assumed proportions of considerable size, when these men decided to establish standard combinations of strength and ductility for a product that had been improved and formerly was regarded by the purchasers as satisfactory for rolling stock without showing prescribed minimum values for tensile strength.

Coincidentally with the inquiry by railroad engineers to ascertain the results of good steel foundry practice, an important viewpoint was manifest among producers, many of whom felt that previously adopted standards for tensile properties, including those indicative of dutility, no longer reflected what is obtainable regularly with modern manufacturing methods. Furthermore, there prevailed a significant competitive condition, developed as the fourfold result of progress in developing ductility in a welded joint, improvement in the ductility of malleable iron, advancement in making alloy gray iron, and development of relatively high strength (accompanying reduced ductility) by heat treating malleable iron. Broadly speaking, the competitive situation, supplementing self-conceived dissatisfaction with old standards for the product of an industry that had made steady progress, established the necessity of revising specifications.

The major problem consisted of determining properties that could consistently be written into Testing society specifications, intended to reflect good but not exceptionally up-to-date foundry practice, in making the "garden" variety of soft carbon cast steel used ordinarily for jobbing, railroad, and marine work. The grade that had been officially described in the miscellaneous specifications as "soft" was the variety required to show not less than 60,000 pounds tensile strength per square inches. The 70,000-pound grade had been described as "medium." Occasionally purchasers inferred that this grade, because it was called "medium," was not readily machineable; and that the 60,000-pound grade, officially termed "soft," was the variety to be considered when low machining cost was a very important factor.

These "soft" and "medium" designations had been used in the miscellaneous specifications continuously since they were adopted in their original form by the Testing society in 1901. Progress made during more than two decades had long since brought the 70,000-pound grade into general use by large consumers who required soft, readily machineable material. Thus the previously employed designations had become deceptive. They presented the opportunity, taken advantage of by some producers of other metals, of publishing comparisons of supposedly typical tensile properties which were misleading, whether or not they were so intended. The producers of other metals should be given the benefit of the doubt, as to the honest intent behind such advertising matter. Unquestionably the steel founders had been negligent in permitting obsolete descriptive terms to remain so long in A.S.T.M. specifications, without raising the issue before it became competitive.

Some additional explanations are needed to put an unusual set of new specifications in proper light, not only as to the method employed for tentative adoption, but to the anticipated effect on other A.S.T.M. specifications for carbon steel castings.

The committee instructed to make a standardization effort was purposely formed to include men prominently connected with several national organizations interested in steel castings. In this way contacts were made, officially or unofficially, with committees of the American Railway association, the Steel Founders' society of America, and the American Foundrymen's association. In the resulting discussions of viewpoints held collectively by important groups of consumers and producers, it became apparent that the underlying purpose would be served initially and eventually by means of an entirely new set of purchase requirements, consolidating those of revised nature for jobbing, railroad and marine castings. Such specifications were developed gradually, as important differences of opinion became harmonized. They contain short, separate supplements specially applicable to railroad and marine castings.

Adopted Tentatively

A final vote in the sectional A.S.T.M. committee was delayed in a cooperative spirit, to permit the opportunity of satisfactorily closing related discussions in committees of the American Railway association, regarding tensile properties for the most frequently used grade of carbon cast steel. These decisions in A.R.A. committees, conforming to the unanimous judgment previously reached in the A.S.T.M. sectional committee, were arrived at too late to enable the Testing society to pass on the matter at its convention in June, 1933. Appreciating the importance of an unusual situation, the society's committee on steel, by letter-ballot endorsed the recommendation of the sub-committee that had approved the proposal of the sectional committee on standardization, to request the committee on standards promptly to tentatively adopt the new consolidated specifications. Such definite action, needed urgently to dissipate much confusion among consumers and producers, was taken in August, 1933 as previously stated. The matter below the title of these tentative specifications as officially published explains the contemplated eventual abandonment of the old miscellaneous and railroad specifications.

The sectional committee which de-

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veloped the new specifications had appreciated the desirability of modernizing requirements for chemical as well as physical properties. The chemical limits that have been established serve automatically to identify the material as carbon steel. The specifications contain another new feature, in a considerable number of explanatory marginal notes phrased to guide the buyer in selecting grades and in understanding the significance of clauses that are somewhat out of the ordinary, and have been included for the purchaser's benefit. Some A.S.T.M. specifications are concise to the point of inadequately enabling the non-technical buyer to make the most intelligent choice of grades and methods outlined for his selection.

The chemical and physical requirements for four grades covered by the new specifications (A154-33T) are shown in Tables III and IV. A fifth grade (Special No. 1) for which no physical requirements are specified, is provided for, as in the old miscellaneous specifications. The most striking differences in the requirements of significance for the average consumer are found by comparing the tensile properties required for the 70,000-pound grade in the old miscellaneous specifications and in the new consolidated specifications. These prescribed minimum values are as follows:

	A27-24 (Old, miscellaneous)	A154-33T (New, consolidated)
Tensile strength, lbs. sq. in.	70,000	70,000
Yield point	45% of T.S.	38,000
Elongation in 2 in., %	20	24
Reduction of area, %	30	36

It may be enlightening to quote the following statement from Specifications A154-33T regarding the 70,000-pound variety, now officially given an appropriate descriptive term: "The regular grade is the variety of carbon cast steel required for most miscellaneous structural purposes, for large tonnages of castings for railway rolling stock, and for many castings for ships. This grade is readily and economically machineable with ordinary machine tools." This definite declaration should terminate all arguments regarding the characteristic condition of machineability.

An effort has been made to describe and interpret the more important events that have preceded, influenced, and attended the adoption of the existing tentative standard specifications of the Testing society for the product of the steel foundry. It happens that the depression years have constituted the most interesting period in the American record of specification-making, so far as steel castings are concerned. The era has been signalized by authoritative evidence of substantial progress made in steel founding; not only in making a worthier product from the common grade of steel, but in producing dependable material from alloy steels. It is probable that the advancement made since 1920 will suffer by comparison with what may be achieved between the present time and 1940.

As in the past, it will be impossible to indicate the degree of progress solely by clauses in ordinary specifications. Earlier reference was made to the varying standards of acceptability, considered as satisfactory by individual producers. Some foundries now offer material having combinations of properties superior to those in the new A.S.T.M. specifications, both for carbon and for alloy steels. Such purchase requirements are merely what they purport to be; namely, tangible standards by which one may approximately ascertain whether the material has those characteristics found in the product of average plants that claim to have modern equipment and to apply experienced technique.

While quality standards claimed to be higher than those officially recognized by such organizations as the Testing society should be carefully investigated, it is undeniable that the number of steel casting plants making an unusually good product is proportionately enlarging. And it is interesting to note that the practice of establishing lists of preferred producers is becoming increasingly popular in the larger consuming circles in America. The wiser buyers of large tonnages now are in the habit of making extensive inspections of those steel foundries that are considered for possible inclusion among selected manufacturers exclusively listed as sources of supply for castings of exceptional quality. The practice substantially is like that followed with general satisfaction by some foreign governments, such as those that have admiralty lists, developed with discrimination.

Plant inspection made intelligently by purchasers cover many highly important details of shop practice that are not feasible to include in specifications adopted by large technical societies. This is due partly to the fact that numerous shop operations are incapable of standardization, and are performed according to the judgment and deals of the management. There is no denying the fact that experienced opinions as to preferred methods often differ when the same ideals are held and when the results of manufacture are comparable. The extent to which there is zealous adherence by everybody concerned to prescribed practices along each of several effective, non-standardized lines frequently is much more important than a useful specification in the production of a high-grade metal product.

Table III

Minimum Requirements for Physical Properties

SPEC. A154-33T (CARBON CAST STEEL)

(Class B Castings Only)

	Grade			
	Regular	Special No. 2	Special No. 3	Special No. 4
Tensile Strength, pounds per square inch	70,000	60,000	60,000	80,000
Yield point, pounds per square inch	38,000	30,000	30,000	43,000
Elongation in 2 inches, per cent	24	22	26	17
Reduction of area, per cent	36	30	38	25

Table IV

Requirements for Chemical Properties

SPEC. A154-33T (CARBON CAST STEEL)

	Class A	Class B
Carbon, max., %	0.45	.....
Manganese, %	0.50-1.00	0.50-1.00
Silicon, %	0.20-0.75	0.20-0.75
Phosphorus, max., %	0.05	0.05
Sulphur, max., %	0.06	0.06

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General information and numerous details relating to spiral pipe, riveted or welded, are presented in catalog 33, recently published by the Taylor Forge & Pipe Works, Chicago. Miscellaneous information and tabular material pertaining to installation of the pipe also are included in the 63-page illustrated catalog, available upon request to the company.

Research Seeks Refinement Of Bright Annealing Gases

VALUABLE contributions to research on the currently popular subject of bright annealing were made at a session of the American Society for Steel Treating in Detroit, Oct. 3, by A. L. Marshall, research laboratory, General Electric Co., Schenectady, N. Y., who reported results of an investigation carried out by himself and a co-worker, Maynard C. Agens, dealing with the bright annealing of steel strip in mixed gas atmospheres. Gas mixtures used were obtained by the combustion of hydrocarbon-containing gases in a deficiency of air.

Complications followed when bright annealing in a gas containing 25 per cent carbon monoxide and 75 per cent hydrogen. The steel was heated for several hours at 650 degrees Cent. in a quartz tube with this gas flowing through, and at the end of the run it was found to be badly etched and had a matte finish. It was deduced that the steel had acted as a catalyst in the furtherance of two reversible reactions between CO, CO_2, H_2 and water vapor, known as the "producer gas reaction" and the "water gas reaction." By determining equilibrium conditions for the two reactions and adjusting gas concentrations with certain limits, it was possible to eliminate the etching.

Hydrogen Must Be Pure, Dry

In bright annealing low-carbon steels, use frequently is made of hydrogen gas, or of some commercial gas containing hydrogen in the elementary or combined form, as the medium for a controlled atmosphere. Some bright-finished steel manufacturers recently have reported success on annealing high-carbon steels in hydrogen-bearing gases and consider that such bright annealing in dissociated ammonia gas—which contains 75 per cent hydrogen—can be accomplished with little or no loss of carbon from the surface of the bar or sheet.

Generally, it has been considered that hydrogen gas is a strong decarburizing agent for steel, although investigations on this point are somewhat contradictory. The apparent contradictions with respect to pure dry hydrogen probably are due to one or more of the following factors: (1) There is considerable difference in interpretation in what is meant by a "pure dry gas;" (2) the time factor in experimentation has varied considerably with different authors, and it would seem that in some cases the time of experimentation has been too brief to permit drawing definite conclusions; (3) the method of determining whether decarburization has occurred illustrates considerable difference in the refinement of technique, and hence in conclusions that would be drawn thereby.

To throw more light on this important subject, a thorough-going investigation was undertaken by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; the results obtained were reported by C. R. Austin of the company's research laboratories at a session of the A.S.S.T. Oct. 2. The paper considered the development of a gas purification train whereby all so-called traces of water vapor and free oxygen could be removed from the gas system. It discussed methods for determining and checking gas purity, and of making predetermined quantitative water vapor additions to the purified gas. Data were given illustrating the decarburizing effect of pure dry hydrogen and of pure hydrogen with known water vapor additions, on a plain carbon steel and on a steel containing 1.5 per cent chromium.

It was demonstrated by chemical and metallographic analysis that the pure gas had a definite but extremely limited decarburizing power at 800 degrees Cent. on eutectoid steels, and that as the water vapor content of moist hydrogen gas was increased, except in very low concentrations, the decarburizing power of the gas also was profoundly increased. In very low concentration—10 milligrams water vapor per cubic foot of hydrogen—the presence of water vapor appeared to reduce further the limited decarburizing power of the dry gas.

Practical Value Recognized

The observations recorded were regarded as having commercial value in the application of "dry hydrogen" to bright anneal of high carbon steels concomitant with freedom from surface decarburization. All specimens were subjected to test in the bright smooth machined condition, and it was noted that the dry gas atmosphere was the only one which yielded a perfect mirror-bright anneal.

Alloys suitable for use at high temperatures have become increasingly important in the last few years. Much attention has been directed upon the physical properties of these metals and alloys at elevated temperatures; on the other hand, little has been applied to their resistance to deterioration at high temperatures through the action of the atmosphere encountered in service. Therefore, to gain information along this line, particularly as to the amount of attack under definite conditions and as to the mechanism of reaction, R. L. Rickett, associate investigator, department of engineering research, and W. P. Wood, professor of metallurgical engineering, University of Michigan, Ann Arbor, Mich., initiated a comprehensive research.

Because some limitations in scope were necessary, the authors studied the action of oxygen and hydrogen sulphide upon iron-chromium alloys containing up to 28 per cent chromium. Oxygen and hydrogen sulphide were selected because they are two fairly typical and quite different corrosive agents.

Mechanism of Scaling

Based on their investigations, the authors proposed the following hypothesis or mechanism of scaling:

1. The alloy first reacts with oxygen or hydrogen sulphide with the formation of a surface layer of those oxides or sulphides of iron and chromium that are in equilibrium with the partial pressure of oxygen or hydrogen sulphide in the furnace atmosphere, and in which the two metals are in the same ratio as in the original alloy.

2. After the formation of this initial layer of scale the rate of scaling is determined by the rate of diffusion of certain substances through the scale.

3. There is a diffusion of the reacting gas or of higher products of reaction inward and of the component metals of the alloy or of lower products of reaction outward through the scale. These diffusion processes may be accompanied by chemical reaction that takes place at the scale-metal interface.

The most important results of the investigation were summarized as follows:

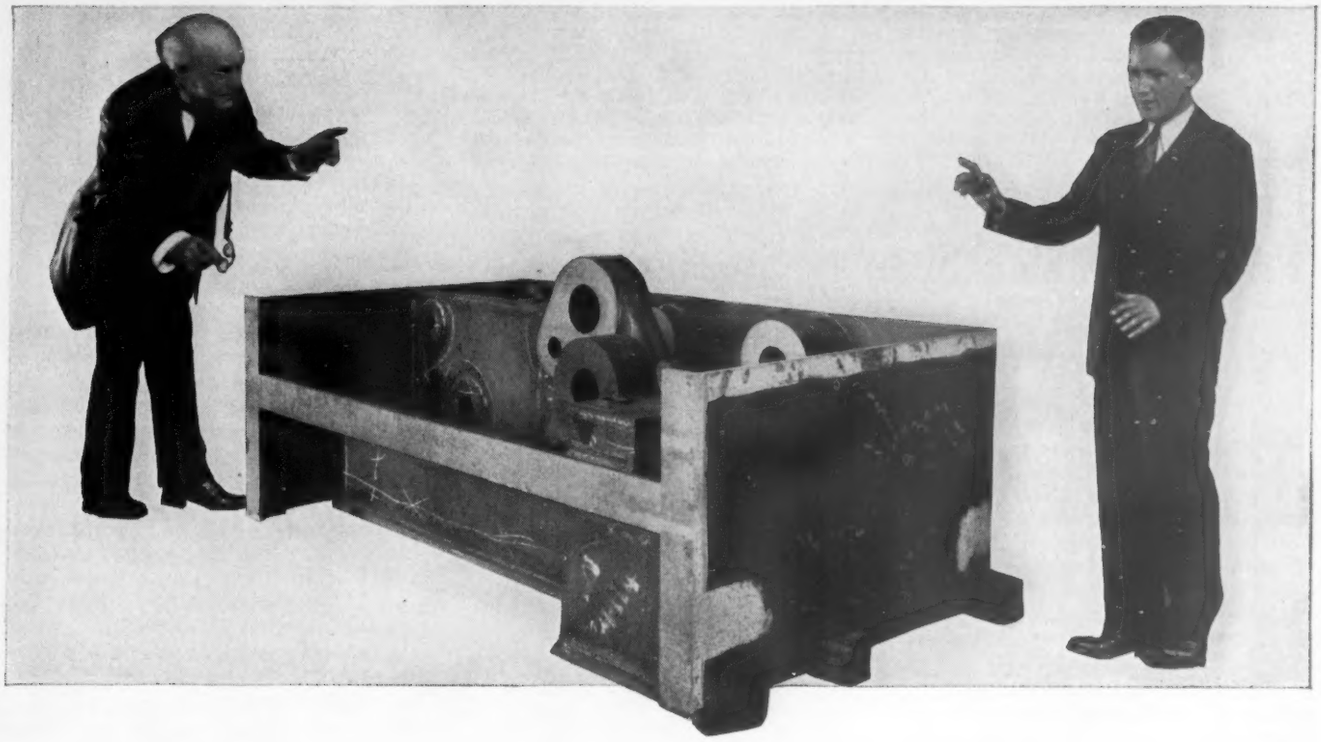
1. Resistance of iron-chromium alloys to oxidation at a given temperature increases relatively slowly at first and then very rapidly as the chromium content of the alloys increases. A chromium content finally is reached beyond which further additions of this element have little additional effect.

2. Scaling of these alloys in hydrogen sulphide at temperatures of from 1400 to 2000 degrees Fahr. is much greater and the effect of increasing amounts of chromium is much less than in oxygen under similar conditions.

3. The rate of scaling in both oxygen and hydrogen sulphide decreased as the time increased and, except in the case of oxidation of a 28 per cent chromium alloy, increased rapidly as the temperature increased up to 2000 degrees Fahr.

4. Increased resistance to oxidation of the higher chromium alloys was found to be accompanied by a great increase in the proportion of chromium in the scale.

5. Observations of the character of



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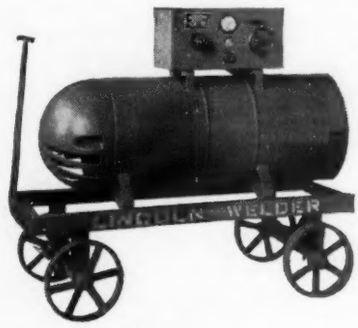

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the scale and a consideration of the published results of another investigation support the hypothesis that there is a diffusion of both the reacting gas or of higher products of reaction inward and of the metal or of lower products of reaction outward through the scale.

6. On the basis of such a hypothesis it is possible to explain the effect of chromium content on the resistance to oxidation and to attack by hydrogen sulphide, and to account for the compositions of the various types of scale. The effects of temperature and of time are consistent with this hypothesis.

Practical Value Seen in Studies of Alloy Constitutional Diagrams

THERMAL conductivites, and effects of alloying elements upon constitutional diagrams of steel were subjects considered at a session of the American Society for Steel Treating Oct. 2. While these subjects were for the most part of a highly technical nature nevertheless ensuing discussion brought out their practical significance.

Presented in abstract form by R. H. Harrington, General Electric Co., Schenectady, N. Y., co-chairman of the meeting, reports were heard on tests performed by S. M. Shelton and W. H. Swanger, bureau of standards, Washington, investigating the thermal conductivities in watts per centimeter per degree Cent. over a range of 0-100 degrees Cent. for zinc, nickel and a few nickel alloys, and 20 irons and steels selected as typical examples of commercial materials. A comparative method of measurement was used, all values being referred to the thermal conductivity of lead, assumed to be 0.352 watts per centimeter per degree at 0 degrees Cent.

For the pure metals and irons and low alloy steels, thermal conductivities were found to increase with increase in temperature, while conductivities for high alloy steels and nickel alloys showed a decrease with increase in temperature. In general, the thermal conductivities of all materials tested revealed themselves as linear functions of the temperature within the range within which measurements were made.

Silicon Effect Noted

An investigation to determine the location of the metastable eutectoid point in hypoeutectoid iron-carbon-silicon alloys containing 1 per cent of silicon was summarized by H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, who acted in a supervisory capacity for the work performed as part of a thesis study by two graduate students at Case School of Applied Science, Cleveland.

Steels containing from 0.14 to 0.76 per cent carbon were cooled through a range of rates including 5 and 100 degrees Cent. per minute. A value was determined for the carbon content of an alloy which would be 100 per cent pearlite. The approximate percentage arrived at was 0.92 per cent carbon. As well as confirming the results of previous research which showed that the presence of silicon raises the temperature at which the lower critical transformation occurs, data in this paper indicated that in the presence of 1 per cent silicon the carbon content of the eutectoid and also the temperature at which the eutectoid transformation takes place are functions of the per cent of carbon contained in the alloy.

Discussion brought out the fact that the work had a definite practical value in regard to the production of malleable castings. Results also apparently refuted earlier beliefs that the carbon content of pearlite was lowered by the presence of silicon.

Dilatometer Tests Reported

A four-part investigation of alloys of iron and manganese; and iron, manganese and carbon was sketched briefly, the first three parts by Francis M. Walters Jr., Carnegie Institute of Technology, Pittsburgh, and the fourth part by Maxwell Gensamer, also of the Carnegie institute.

The first part dealt with a demonstration of the pronounced heterogeneity which may arise in the solid state when an alloy of iron and mangenese is heated into a two-phase region. This was observed by means of the dilatometer.

The second part, in which John Eckel, Gulf Refining Co., Pittsburgh, co-operated, comprised a thermomagnetic analysis of the binary alloys of iron and manganese, variations in magnetism being observed by means of the ballistic galvanometer.

The third part of the study discussed the variation of electrical resistance with temperature in binary alloys of iron and manganese. Cyril Wells, of the Carnegie institute, aided in this work. Percentages of manganese were found to effect a pronounced increase in resistance and decrease of temperature co-efficient in alpha iron from 25-1000 degrees Cent. It was further reported that manganese had little effect on the resistance of gamma iron.

In the concluding portion of this comprehensive study Mr. Gensamer reviewed dilatometric and microscopic observations on ternary alloys of iron and carbon with 2.5 and 4.5 per cent manganese. Practical importance of these four investigations was seen in their effect upon applications of high-manganese steels.

Quenching of Simple Shapes

In connection with the quenching of steel a number of problems have arisen which for their solution require a knowledge of the cooling rate distribution within simple shapes during quenching. Does an increase in quenching temperature actually produce faster cooling as is apparently implied by the resultant deeper hardening? What is the ultimate limit of cooling rates attainable in steels by increasing the quenching power of quenching media? What is the sequence of transformations in shallow hardening steels?

These and related questions can be answered by a study of cooling rate distribution during the quenching of a simple shape as affected by the important variables of quenching, namely, size of piece, kind of quenching medium, and quenching temperature, stated Howard Scott, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in presenting a paper before the society Oct. 3.

The investigation involved the quenching of a series of steel cylinders of various proportions in several quenching media and calculating the relations between time, temperature, diameter of cylinder, position therein and cooling constants. The studies led to the following conclusions:

1. Cooling rate distribution can be determined by the method used under conditions not amenable to purely experimental attack.
2. The cooling rate at the center of a long cylinder is indicative of the maximum size that can be fully hardened and can be estimated for water, oil or air quenching from its diameter with fair assurance of accuracy.
3. Cooling rates at the center of cylinders quenched in water or oil do not vary much from the maximum value over a considerable temperature range within which the rate of Ar_1 reaction in the steel reaches a maximum.
4. During quenching of larger cylinders in air or of very small ones in oil or water, the maximum cooling rate is reached shortly after beginning the quench and cooling thereafter is expressed by very simple relations.
5. As diameter is increased the advantage of water over oil quenching in producing faster cooling at the center tends to diminish, provid-

ed other factors do not change excessively.

6. A well-agitated water quench approaches close to the fastest physically attainable as judged by the cooling rate at the center.

7. The chief advantage of exceptional quenching power is to insure uniform shallow hardening in fine-grained steels.

A great deal of confusion has existed as to the relation between the cutting speed and tool life per grind in turning, therefore, a report of a comprehensive investigation on the life of tools as influenced by shape was received enthusiastically. The research was the latest of several in this field conducted by the University of Michigan, Ann Arbor, Mich., under the direction of Prof. O. W. Boston, director, department of engineering shops, and W. W. Gilbert, research fellow.

The relation between the cutting speed and tool life for a given tool when cutting a given steel under constant conditions long has been known to follow the equation $VTn=C$, where V is cutting speed, T is tool life, n is an exponent, and C is a constant. This relation has been shown at different times to hold for tools of different compositions when cutting a steel, and tools of a constant type when cutting various steels. There is a wide range in value of exponent and constant, however, as factors such as tool material and shape, material being cut, size and shape of cut, etc., are varied. The relative importance of these factors has not been clearly defined.

Prof. Boston presented the results of an investigation to determine the value of the exponents and constants of the tool-life cutting-speed equation for a given tool of high-speed steel when cutting an S.A.E. 2345 steel forging. All tests were run dry and the data submitted were from cuts 0.100 inch in depth and 0.0125 inch feed per revolution.

The variables studied were the tool-nose radius, side-cutting angle, side-rake angle, and back-rake angle. It was shown that there is a definite relation between each of these variables and the exponent and constant of the equation.

Link Theory and Practice in Welding Investigations

THEORY and practice in various phases of welding held the interest of the American Welding society at a meeting in Detroit, Oct. 3. Typical of the discussions which received enthusiastic comment was that by Charles H. Jennings, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., on physical properties of welded cast steel. The speaker pointed out that an investigation was undertaken to determine the physical properties of butt and fillet welds made on this type of material.

Conclusive data yielded by the research showed that cast steel can be arc welded successfully to cast steel or hot-rolled low-carbon steel by means of bare and fluxed electrodes; welding on cast surfaces is not harmful and the results are equal approximately to those from welds made on machined surfaces; ductility obtained from welds made on various combinations of cast steel to cast steel as indicated by the free-bend method is: Bare electrodes 8 per cent, fluxed electrodes 27 to 33 per cent.

The first paper ever to be given before a technical society on welding of Inconel, a new alloy, was presented by F. G. Flocke, International Nickel Co. Inc., New York, J. G. Schoener and R. J. McKay. Analysis of this material is 80 per cent nickel, 14 per cent chromium and 6 per cent iron. All the commonly used methods of welding may be employed, including the fusion and resistance types. Development of the flux-coated electrode for metallic arc welding has contributed to the ease with which the metal can be welded.

While no flux is used ordinarily in gas welding pure nickel, it was found that unless considerable care were exercised in employing this procedure with Inconel, the chromium constituent would oxidize readily when flux was omitted. Use of flux is a convenient means of keeping oxidation under control and generally is recommended.

Surveys Pipe Welding

Welding of nonferrous piping was outlined by D. E. Roberts, Linde Air Products Co., New York. Because of the increasing development in air conditioning, he saw wider use of copper and brass piping which meets many of the requirements in this field. Welds which utilize the full wall thickness of the pipe with no increase in weight are most desirable. Bronze welding was the method considered and the joints were of the bell and spigot as well as butt types.

Welding methods on copper was one of the phases treated by Ira T. Hook, American Brass Co., Waterbury, Conn., in discussing small welded Everdur tanks. In welding copper, he asserted, a deoxidized copper or copper alloy rod should always be used for the weld metal. This rule should be observed whether the base metal be oxygen-bearing or deoxidized copper. Principal limitations to the use of well-established welding methods to copper are found in the weakened zone of the oxygen-bearing copper and the high heat conductivity of the metal. The former can be overcome many times by hot forging the finished weld at a dull red to black heat and reheating to a bright red for recrystallizing. The high heat conductivity limits the application of the arc, the metallic arc in particular, to a thickness of base metal of 3/16-inch. Everdur contains 96 per cent copper and is welded readily by any of the usual methods.

Emphasis on Time Control

An interesting discussion on the development of resistance welding electrical power control devices was prepared by R. L. Briggs, Thomson-Gibb Electric Welding Co., Bay City, Mich. Summing up his observations on the various types of equipment available, the speaker found it evident that in refinement the timing control equipment has exceeded the devices used to regulate the magnitude of the welding current. In a sense, he said, this is understandable, because except for one class of work the major control problem always has been to get the proper amount of heat into the weld. There is one class of work, however, where it is essential to make the weld in certain definite time limits. This is found in welding the stainless steel group; the weld must be made and chilled rapidly to prevent the carbides from precipitating. For this class of work, Mr. Briggs believes equipment is needed which gives a closer adjustment of secondary current magnitude than is now available.

Possibilities of welding by the electric arc under water proved intensely enlightening as described by Professors C. D. Jensen, N. S. Hibshman and W. E. Harvey, Lehigh university, Bethlehem, Pa. Since the advent of covered electrodes several years ago two types of commercial electrodes have been found which meet the requirements of under-water welding by burning up evenly at a slower rate than the metal rod, thereby forming a protecting case around the arc. Experimental work in this direction reveals that welds of good quality may be made on low-carbon steel under water. This method of welding may be useful in work in which it is desired to limit the heat penetration from the weld to avoid distortion of the parent material from excessive heating or where it is desired to make a weld shielded from nitrogen and other gases present in air.

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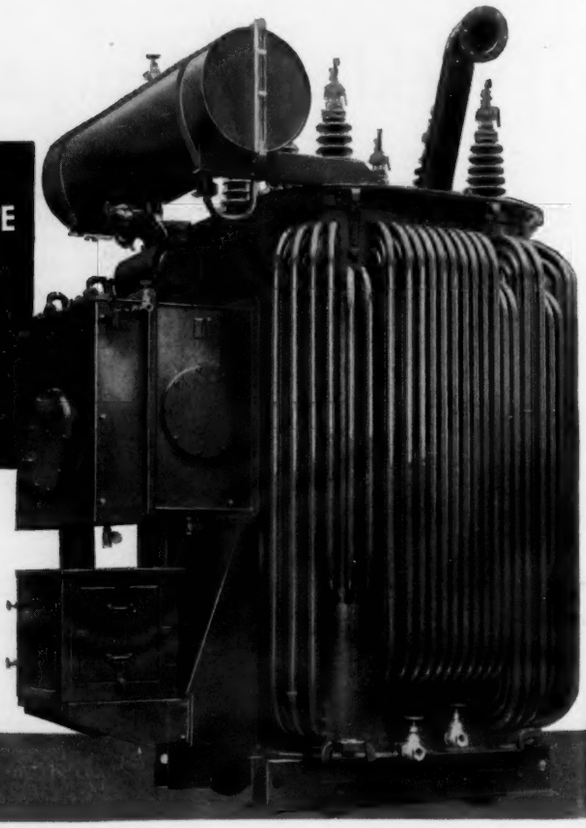

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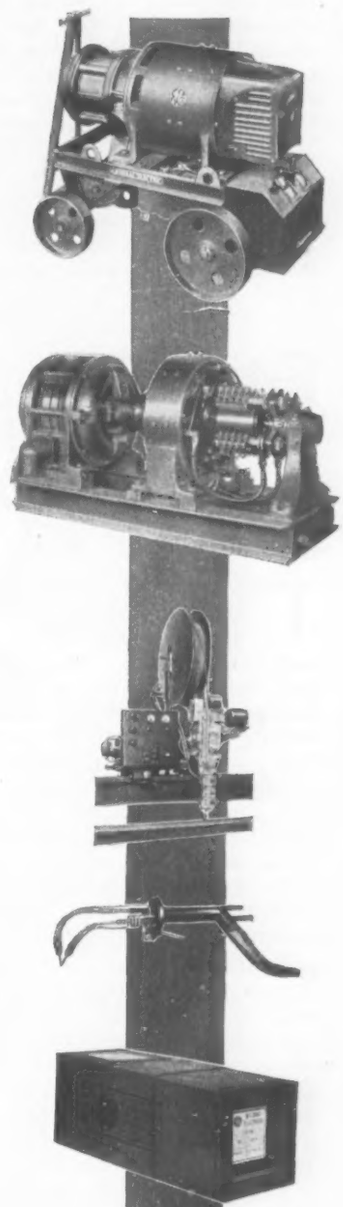

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two angles on opposite sides of a connecting plate, or of two angles with two connecting plates, welded joints result in higher ultimate loads in pounds per square inch of net section than do riveted joints. This was one conclusion reached by Dean R. P. Davis and G. P. Boomsliter, West Virginia university, Morgantown, W. Va., in investigation of tensile tests of welded and riveted structural members. In tension members composed of a single angle or two angles on the same side of the connecting plate, the ultimate strength of the member per square inch of net section is about the same for welded and riveted end connections. Based on the gross section the welded member is stronger because of the greater effective area.

Good magnetic properties in metal deposited by welding depend upon several primary factors. If no further heat treatment is possible and welding must be used, best results will be obtained by the use of an electrode of the heavily-coated type. These facts were brought out by W. F. Heese, Rensselaer Polytechnic institute, Troy, N. Y., in his discussion on the magnetic characteristics of deposited metal. Caution, he said, must be used in this connection, however, because many of the heavily-coated electrodes give only a slight improvement in properties. This may be due either to the electrode containing materials which adversely affect magnetic properties, or to impurities introduced by the coating. Electrodes high in manganese are poor magnetically.

Stress distributions on welded connections were described by Prof. S. C. Hollister. Purdue university, Lafayette, Ind. Through the medium of slides he illustrated a series of studies he made with different types of loadings on welded members. The photoelectric method of inspection was employed.

Friction Causes High Loss of Power in Wire Drawing

TUNGSTEN carbide dies are highly suitable for drawing the larger sizes of copper wire, and diamond dies for the finer sizes. This fact was brought out at the opening session of the Wire association's fourth annual meeting, in Detroit, Oct. 3, in the presentation of a paper entitled "Sizing and Resizing Carbide and Diamond Dies for Copper Wire Drawing," by J. J. Kehoe and F. D. Ruhl, designing engineers, wire and processing engineering departments, respectively, General Electric Co., Schenectady, N. Y.

That it is impossible to make a die a true cylinder except under laboratory conditions, was brought out in the discussion which followed. The die always is conical in shape. Nothing is inherently wrong with tungsten carbide dies when drawing small sizes of copper wire, a speaker stated; small sizes can be processed without wearing out the die quickly, but the cost will be found to be higher than when diamond dies are employed.

Not less than one-third of the power absorbed in wire drawing is wasted in friction, and if all wire drawing plants were considered, probably friction would account for one-half of the power used, in the opinion of Kenneth B. Lewis, consultng engineer, Worcester, Mass. Summarizing salient features of a study of die stresses and strains, Mr. Lewis explained his recently developed basic formula for obtaining the die pull. In order to make metal flow in the die it must be stressed exactly to its yield point, he stated. The simplest form of stress is the tensile pull.

Mr. Lewis mentioned that the work of the die is eased by pulling backward on the entering wire and to prove his theory, he passed the tail of an undrawn wire over a pulley, hung a weight on it, attached a spring balance to the front end of the wire and read the die pull. The draft which should have taken 21 pounds took only 9 pounds. He explained that the wire was sent into the die under a high stress, the die having to stress it only the remaining distance to the yield point.

Force Required Is Constant

Within limits of reasonable practice, the speaker contended that the force required to deform metal in the die is constant. The mean yield point of wire always is fairly close to its initial tensile strength. In fact, Mr. Lewis stated, the mean yield point is the arithmetical mean of the yield point of the starting wire and 84 per cent of the tensile of the finishing wire. Within the limits of current practice, the coefficient of friction is little affected by the die angle, and, assuming a uniform degree of die polish and excellence of coating, is a constant factor, he explained.

Select a capable die supervisor and the difficulty with dies practically is eliminated, stated a member in discussing some of the features which lend themselves to the successful operation of a wire drawing establishment. If a die is too small, he emphasized, the die will be crowded and will be found expensive after about four month's operation. Die rooms, he stated, should have only one entrance. No wiredrawer should ever be permitted to enter the die room, he cautioned; instead, he stated, the die room should have a window in the wall through which dies are received and delivered.

In speaking of the characteristics of inhibitors, F. P. Spruance, American Chemical Paint Co., Ambler, Pa., pointed out that pickling speed can be seriously retarded, and even stopped, by the use of improper materials, notable among which is arsenic. The presence of the latter in the pickling bath is so serious, he stated, that but a trace of it, in the acid itself, will have a marked effect in retarding the pickling. Laboratory tests, he contended, should be run over a period long enough to correspond with the whole life of the pickling bath, from the time it is charged until it has dissolved enough iron to make further operation uneconomical. Keeping accurate records of acid and inhibitor consumption is a matter of importance, he concluded, because leaks thereby are soon detected.

Washing Is Debated

Whether or not pressure hose is necessary in washing rods brought out a divergence of views. Pressure water is used more in wet wire drawing than in dry drawing, according to the expression of one member. Another comment from the floor was that specialty mills use pressure water for this purpose whereas common production mills are deleting this method of washing from their practice.

The question submitted by one member as to whether soap can be applied out of solution and baked on the wire brought out the fact that an application of soap in the cleaning house gives the rod a film which results in a large saving of lubricant at the die block. One operator mentioned a practice where soap is added to the lime tub with good results.

Cooling tungsten carbide dies results in an increased tonnage of drawn wire between dressings, according to an operator employing this type unit.

In answer to the question "Does cold lime make a brighter wire?" one operator mentioned that his practice formerly was to use cold lime and draw in grease for this grade of wire. Using lime hot, he pointed out, causes streaks on the surface of the wire. From three to five drafts are taken with cold lime. The lime in the vat is agitated best with steam, he stated.

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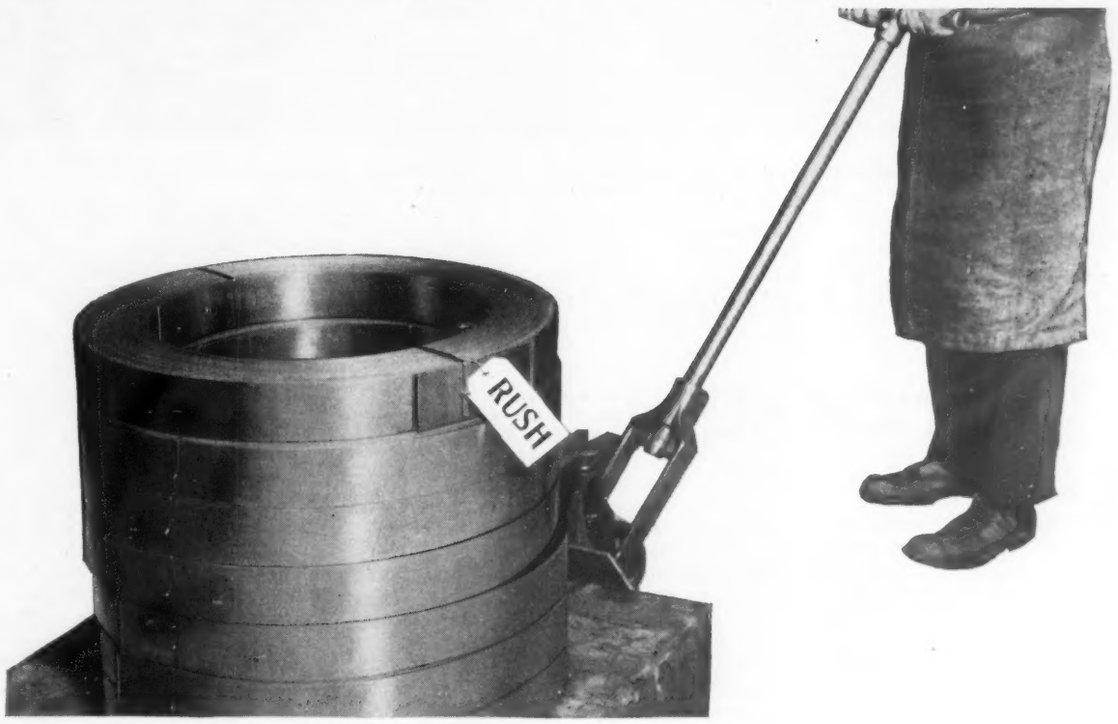

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General view of National Metal exposition in Convention Hall, Detroit, shortly before the doors were opened Tuesday noon (see also news section)

A First-Hand Glimpse of Exhibits at the NATIONAL METAL EXPOSITION

REFLECTING the improved position of industry during recent months, the Fifteenth Annual National Metal exposition conducted in Detroit, Oct. 2-6, in connection with the National Metal congress, assumed completeness and size which were reminiscent of shows held in years preceding the depression. Exhibitors totaled approximately 135, the largest in several years, and exhibit space in Convention Hall represented an increase of some 40 per cent over that in Buffalo just a year ago. Attendance throughout the week was heavy, surpassing measurably the expectations of the exposition sponsors.

Among the products displayed prominently were steels in various compositions for a wide range of applications, including heat, acid and corrosion resistance; gray iron and steel castings; die castings; nonferrous metals and alloys; electric and gas-fired heat treating furnaces; combustion equipment; welding machines, torches and accessories, accompanied by samples of welded work; temperature control and recording devices; metallurgical and metallographic testing apparatus; metal cutting machinery; refractories; abrasives, heat treating and cleaning compounds; lubricants; metal protection finishes, and numerous miscellaneous items. Each exposition becomes more diversified than its predecessors, thereby measuring the continuous progress of the metal working and treating industries.

Stainless and heat-resisting steels were displayed prominently by many makers of these grades. Republic Steel Corp., Youngstown, O. showed various applications of alloy steels including automobile and tractor gears, ball and roller bearings, miscellaneous automobile forgings, tubing and aircraft parts. A variety of commodities fabricated of stainless and heat resisting steels manufactured by the company also were exhibited, including kitchen utensils, bolts and nuts, sinks, tubing, parts for automotive trim, boilers, etc.

18-8 Refrigerator Chamber

One of the features of the Allegheny Steel Co.'s exhibit was a refrigerator cooling chamber made of 18-8 alloy, depicting the ease with which this grade steel can be formed, resistance welded, silver soldered, ground or polished, tinned, and plated. The company also had available for inspection sheets and plates showing the various types of finishes available.

Constituting the principal items at the booth of the Superior Steel Co., Pittsburgh, were such automobile parts as lamps, hinges, radiator shells, moldings and tire covers, as well as architectural and building hardware all made from rust-resisting strip steel. Miscellaneous products fabricated of stainless and heat-resisting steels also were displayed by the American Sheet & Tin Plate Co., Carnegie Steel Co. and National Tube Co., Pittsburgh; and the Illinois Steel Co., Chicago.

A. Milne & Co., New York, devoted its display to drill, high-speed, alloy, file and tool steels; and all-steel anvils made of Swedish steel. Various grades of high-speed, tool and alloy steels, in addition to hot work die steel were exhibited by Edgar Allen Steel Co. Inc., New York. Darwin & Milner Inc., Cleveland, devoted its display to tools and dies made from high-carbon, high-chromium steel and from cobalt-chromium steel. The company also displayed welding rod of alloy quality and cobalt-chromium steel castings.

Tubing and alloy steels for transmission and differential gears were built into a special display at the booth of the Timken Steel & Tube Co., Canton, O. Steel mill scenes formed the background of the display of the Jones & Laughlin Steel Corp., Pittsburgh. Two scenes were animated, one showing a bessemer converter blowing a heat, pouring and dumping the slag at the end of the pour; and the other showing a heat of steel being tapped from a tilting open-hearth furnace into a ladle, and a crane spotting the ladle over the ingot molds at the pouring station. Recently developed products displayed by the company included bessemer screw steel, seamless mechanical tubing and hot rolled

ADVERTISING PAGES REMOVED

seamless boiler tubes. Other commodities shown included wire and wire products, shafting, tin plate, shapes and tubing.

Fourteen kinds of steel sheets formed an attractive part of the exhibit of the Bethlehem Steel Co., Bethlehem, Pa. The company's recently developed zinc-coated wire also was shown as well as billets and various types of bars of alloy quality. Another display of the company included heat-treated bolts, hot-forged nuts and setscrews. Several new types of the company's wide-flange shapes as well as sheet piling were shown. Various merchant bar sections and commodities made from flat-rolled material manufactured by its subsidiary companies were displayed by the National Steel Corp., Detroit.

To demonstrate severe conditions to which its welding wire is suitable, the American Steel & Wire Co., Chicago, operated a welding machine in its booth. Various grades of wire manufactured by the company as well as springs, cold-rolled strip and bars of carbon, alloy and stainless steels also were exhibited. A feature of the display of the Youngstown Sheet & Tube Co., Youngstown, O., was a model of a mechanized sheet mill recently developed by the company. Illuminated views incident to the manufacture of steel formed an attractive background of the company's display.

At the booth of the Carnegie Steel Co., Pittsburgh, attention was attracted to the samples of various grades of carbon steels illustrating the effect of inherent grain size on hardenability and other physical properties; and the influence of grain size on forging and heat treating characteristics. The display also included various test specimens, automobile forgings and tools.

ROLE played by research in modern industrial processes was depicted by a moving picture film at the booth of the International Nickel Co., New York. Important applications of nickel alloys including a cast-iron crankshaft and various camshafts were shown. A newly developed vanadium forging steel was displayed at the booth of the Vanadium Corp. of America, New York. Various samples of ferroalloys and metals were available for inspection at the exhibit of the Electro Metallurgical Corp., New York.

In addition to a large piece of molybdenum ore displayed at the booth of the Climax Molybdenum Co., New York, the mine of the company at Climax, Colo., and the experimental laboratory at Detroit were shown in the form of moving pictures. Various samples of metallurgical and chemical products containing molybdenum were shown by the Molybdenum Corp. of America, Pittsburgh.

Samples of wires and springs adapted to the requirements of the automotive and allied industries and including music, stainless steel, valve spring steel, machinery and rope wire were displayed by the Wickwire Spencer Steel Co., New York. The exhibit included display boards showing conveyor belts made of wire, and engineering charts showing performance data.

TWO German-built portable punch and shear machines, largely of welded steel plate, were shown in operation by Henry Pels & Co., New York. Other foreign-built machinery was found in the exhibit of Marburg Bros. Inc., New York, including a punch shaper for forming small intricate dies, a sawing and filing machine for work on small dies, a mirror comparator for production use and a triple-action gear lapping machine. A submerged high-speed cutting machine for use with metal, glass, porcelain or compositions, was a part of the exhibit of the Andrew C. Campbell division of American Chain Co. Inc., Bridgeport, Conn. Metal saws were displayed by the Victor Saw Works Inc., Middletown, N. Y.

LACK of space prevents complete description of all the products and equipment on display. In next week's issue further details will be published, dealing with welding and cutting machines and accessories, instruments, testing machines, alloys, castings, furnaces, refractories and abrasives

CHEMICAL products used in degreasing and cleaning of steel preparatory to plating or other finishing treatment occupied a prominent position in several of the exhibits. Dow Chemical Co., Midland, Mich., had in operation a small model vapor-phase metal degreasing machine, designed to illustrate the effectiveness of an organic solvent which the company manufactures. The main portion of this company's exhibit, however, was given over to a display of various parts of light magnesium alloy. These articles included sand and die castings, extruded sections, forgings, plate and sheet, and specimens of riveted and acetylene and electric spot and seam welded parts.

J. B. Ford Sales Co., Wyandotte, Mich., showed specialized cleaners and alkalies, including recent developments in metal cleaners for cleaning before all electrodepositions; and cleaning before bonderizing and all types of finishing operations. Attention was drawn to this exhibit by miniature illuminated glass tanks, containing air agitated cleaning solutions. A degreasing machine for removing grease, dirt, oil and chips from stamped and machined parts prior to finishing treatment was operated by G. S. Blakeslee & Co., Chicago. Metal cleaners for industrial use were displayed by Dearborn Chemical Co., Chicago, as well as a method for water conditioning and a special type of rust preventative compound.

Applications of a heavy grease containing fine graphite were featured in the booth of National Carbon Co., Cleveland, in addition to a full line of carbon products including brushes for electrical equipment and large electrodes for electric furnaces.

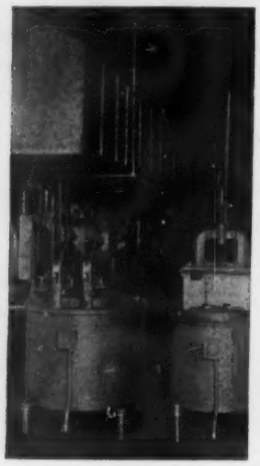
Center attraction in the unusually colorful booth of E. F. Houghton & Co., Philadelphia, was a series of glass disks, mounted horizontally one above the other, from which dripped a new type of industrial lubricant. High film strength and adhesiveness was shown by the stringy manner in which the material dripped from the top disk over the edge to each succeeding larger size disk. Properties of the new lubricant have been developed by a special polymerization treatment (see p. 27). In this exhibit a new type of nonskid leather belting was also shown, in operation.

A NEW gasket material in powder form was a feature of the display of the Cling-Surface Co., Buffalo, the material being applied to flange union joints. D. A. Stuart & Co., Chicago, had in operation in its booth an extreme-pressure lubricant testing machine developed by General Motors research laboratories. The machine was in daily operation checking the lubricity of unidentified lubricants which were supplied by visitors.

Recent developments made in industry in adaptation of the aerocase method of cyaniding were featured by the American Cyanamid & Chemical Corp., New York, chiefly with the aid of a motion picture film. Engineers in the booth of E. I. duPont de Nemours & Co. Inc., Wilmington, Del., devoted much of their time to interviews with visitors having problems in heat treating and case hardening.

A variety of iron and steel parts, all of which were processed by one or more of the products manufactured by Grasselli Chemical Co., Cleveland, was displayed attractively by this company. A portion of the exhibit was devoted to showing the application of zinc and cadmium as protective coatings. A practical small-scale demonstration of pickling various types of iron and steel, with and without the use of inhibitors, was carried out by engineers of the company who were in attendance at the booth.

Making the Most of



METHODS AND MATERIALS

IN THE automotive field, a great variety of parts are being hard chrome plated. Where the cost of plating and regrinding is less than the cost of new parts, a saving can be made by salvaging parts accidentally overground. Wrist pins, ball races, steering knuckles, rocker arm shafts, valves, camshafts, crankshafts, pump parts and cylinder walls are some of the parts which have been plated. Wrist pins are being plated as a regular operation in some cases. After the finish grind, a thin plate of chromium is applied, the pins being carried through the plating bath on a mechanical conveyor, insuring each piece being subjected to the action of the current for the correct time and consequently controlling the amount of deposit closely. In the airplane field, where government inspection requires maintenance of all parts in perfect condition and where overhauling of engines is required after a limited time in the air, a considerable saving is being made by building up worn parts with chromium. Such parts are crankshafts, rocker arm shafts, bearings, and the like.

$ $ $

An English foundry has built a pig mold conveyor extending from the foundry floor to the cupola charging platform. Over iron poured into pigs is carried directly to the charging floor.

$ $ $

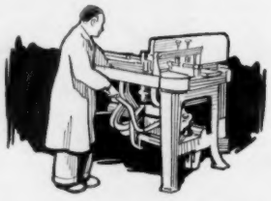
BY SUPERHEATING to between 2550 and 3000 degrees Fahr., an alloy iron containing from 0.10 to 2.0 per cent chromium; 0.10 to 2.0 per cent molybdenum; 1.75 to 3.75 per cent carbon; 0.50 to 3.0 per cent silicon; and 0.25 to 2.0 per cent manganese, it is claimed in a recent patent that a matrix of essentially all pearlite interspersed with finely divided particles of graphite is obtained. It is also said that the chromium and molybdenum contents are sufficient in amount to increase the stability of the carbide present at elevated temperatures.

$ $ $

A manufacturer of steam shovels and other excavating machinery is making use of the oxyacetylene cutting machine as a major production tool for cutting shapes from rolled steel. Utilization of this process has reduced costs and speeded production, it is claimed. On shape cut parts an average of 75 per cent of the usual amount of machining has been saved.

$ $ $

Protection of machine mechanisms, particularly in locations where abrasive dust pervades the atmosphere, is a problem which often confronts engineers. An idea in this direction is offered by the application of pyralin in the form of a transparent hood for use over a press designed to produce small porcelain parts. Material processed in the machine is



in powder form and usually the locations in which these presses operate are ridden with considerable porcelain dust. This dust, because of its abrasive action, plays havoc with bearings and sliding machine parts which, therefore, must be shielded. The hood enables operators to ascertain the cause of possible disturbances in the drive of the machine.

$ $ $

Investigators at a prominent midwestern malleable foundry discovered that by superheating standard commercial mixtures up to 2970 degrees Fahr., and electric furnace iron of low carbon and low silicon content up to 3180 degrees Fahr., the normal malleabilizing cycles may be reduced by 50 per cent.

$ $ $

The blowpipe often is utilized for annealing rustless irons, particularly those containing 12 to 14 per cent chromium, after welding in cases where it is not possible to use furnaces. When using this method of annealing, care must be exercised not to heat the metal above 1300 degrees Fahr. The benefit to be derived from blowpipe annealing will depend on the care used in controlling the temperature and time of heating. Usually 3 minutes within the range of 1250 to 1300 degrees Fahr. will give the desired softening effect.

$ $ $

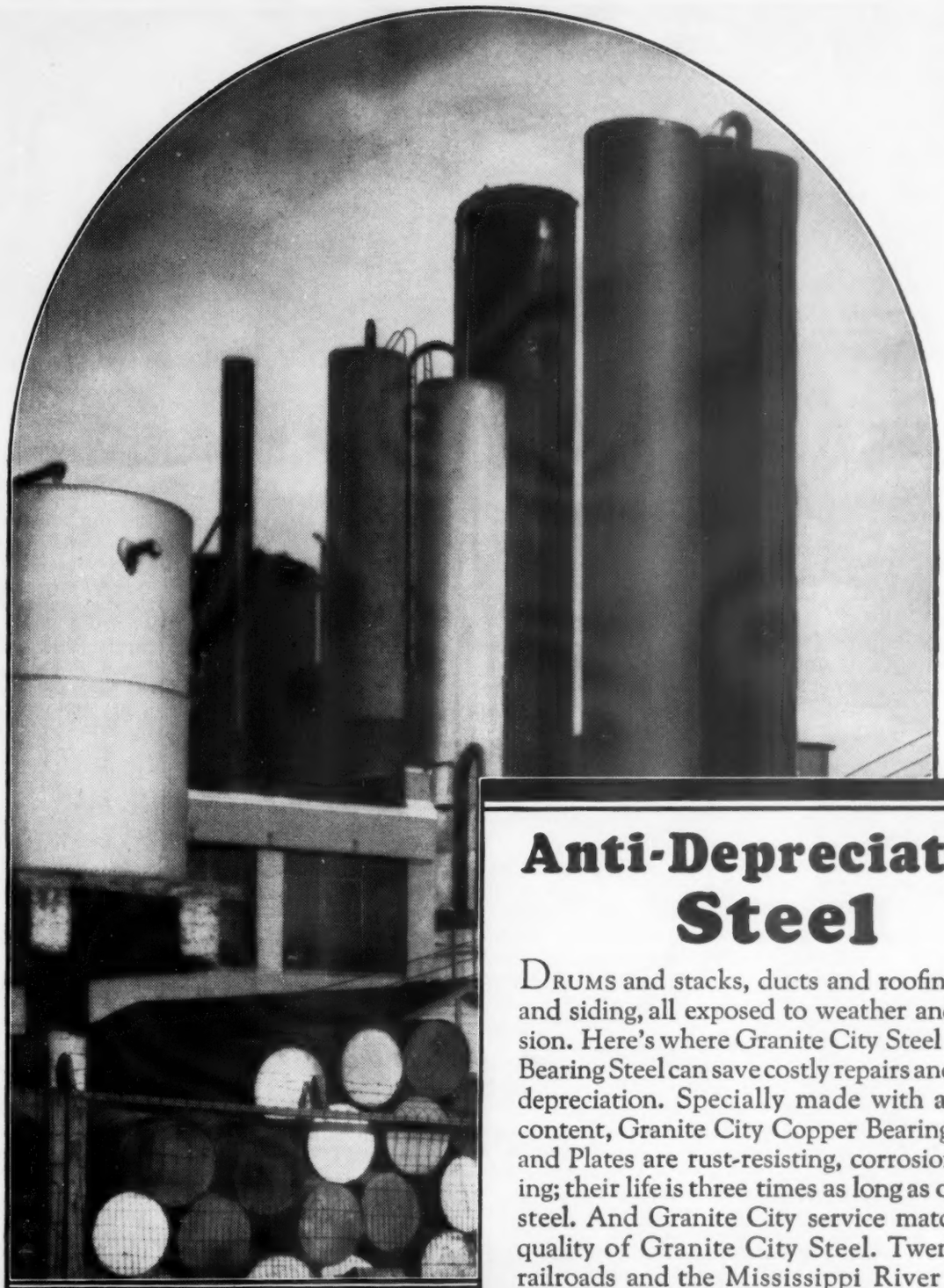
BEFORE starting up a ball mill on cold wintry mornings an eastern cement plant formerly heated the oil in its gear reducer with gasoline blow torches. This annoyance was overcome by installing an electric heater. Now the operators merely place a 1000-watt air heater beside the gear unit before going home in the evening. The mill thereby is ready for service when the whistle blows the next morning.

$ $ $

Valves and other equipment for high-pressure or high-temperature steam and oil lines now are being made of steel containing from a trace up to 0.50 per cent carbon; 4 to 8 per cent chromium; and 0.75 to 2.0 per cent tungsten. It is claimed that the steel has an absence of the brittle range from 900 to 1500 degrees Fahr., and unlike some other alloy steels employed for the purpose, gives as indication of impending failure. The steel possesses a low creep value and is resistant to hydrogen sulphide corrosion.

$ $ $

Rustless iron containing 11.5 to 15.0 per cent chromium and a maximum of 0.12 per cent carbon can be bronze welded successfully. It is necessary that the surfaces to be welded be clean and free from oxide. The proper flux must be used. No after annealing is necessary or advisable as the application of bronze to steel takes place at a temperature lower than that which affects the properties of the iron. To heat treat after bronze welding also will be likely to melt off the bronze. Obviously, where a color match is not necessary, the use of bronze welding will have many attractive considerations. Its strength is high—the order of 55,000 pounds per square inch—and it has good resistance to corrosion.



Anti-Depreciation Steel

DRUMS and stacks, ducts and roofing, tanks and siding, all exposed to weather and corrosion. Here's where Granite City Steel Copper Bearing Steel can save costly repairs and reduce depreciation. Specially made with a copper content, Granite City Copper Bearing Sheets and Plates are rust-resisting, corrosion-resisting; their life is three times as long as ordinary steel. And Granite City service matches the quality of Granite City Steel. Twenty-nine railroads and the Mississippi River serving this mill assure better deliveries to the Mississippi Valley, the West and the Southwest.

Chicago, Dallas
Kansas City
Los Angeles

GRANITE CITY COPPER BEARING STEEL

San Francisco
St. Louis
St. Paul

GALVANIZED SHEETS
STEEL SHEETS
PLATES AND
TIN PLATE

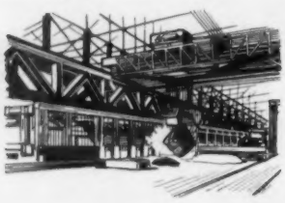
NRA MEMBER U.S. WE DO OUR PART

GRANITE CITY STEEL CO

GRANITE CITY, ILLINOIS

PROGRESS IN STEELMAKING

METAL of a new type—one that is cast readily and may be forged or rolled—has been devised by an Ohio steelmaker through the medium of the electric furnace. The new product contains 1.80 per cent carbon and 1.60 per cent silicon; it presents a microstructure of cast iron and physical properties of steel.



APPROXIMATELY 64 per cent of the loss of heat by radiation in open-hearth furnaces occurs in the roof and end walls, according to an Ohio steelmaker. Insulation of open hearths promotes a uniform heat distribution, but to be effective the entire furnace should be insulated.

♦ ♦ ♦

Oil that does not break down nor wear out has been developed for steam turbines. The new lubricant reduces the oil consumption and eliminates forced shutdowns.

♦ ♦ ♦

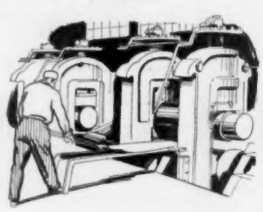
Several photoelectric pyrometers have been installed in the steel industry. Two of them are used in connection with tube mills in the Pittsburgh district to measure the temperature of tubing as it comes out of the mill. One of these is provided with a recording chart. The photoelectric cell measures the amount of light given off by the hot tube and this is calibrated to indicate a temperature on a meter by means of a pointer. When once properly calibrated the photoelectric pyrometers are accurate and fast. They are applicable to temperatures of 1500 degrees Fahr. and higher. Considerable interest prevails at this time as to the use of these units to determine whether ingots and billets are at the proper rolling temperature. These pyrometers can also be used as controllers.

♦ ♦ ♦

Annealing low-carbon strip steel in 5-ton lots and in bell-type, electrically-heated furnaces affords an economy of 131 kilowatt hours per ton over a 4-month run. Time required to heat the stock to 1200 degrees Fahr. averages about 13 hours.

* * *

In the works of several English steel and related companies visual spectroscopic instruments are being used for control purposes. The instrument known as the steeloscope is a 2-prism glass spectroscope and in some cases is employed for sorting loads of scrap steel. In others, it is used to perform an analysis preparatory to heat treatment of the specimen. Frequently it is employed for checking bars of steel before they leave the plant. If a bar of another alloy slips into a consignment by mistake, the spectroscope picks it out immediately.



ROUNDED corners and controlled structure are features of scouring brick recently developed for polishing hot and cold mill rolls. Elimination of sharp corners is said to effect a reduction in cross breakage, spalling and scratching. Wide spacing of the particles of abrasives promotes an increase in the polishing action. The pores of the abrasive also are larger thus permitting deeper cuts to be taken. Because of this clearance and freer cutting action, a stronger bond can be used, which in turn results in longer life of the scouring blocks. A comparative fine grain is used to assure a high finish and shine. The structure of the blocks affords the proper distribution of induced heat stresses which frequently result in breakage.

TWO compression springs, one within the other, which operate a removable metal diaphram, are the basis of a newly devised adjustment regulator for use with oxyacetylene gas. The regulator is sensitive for the fine pressures of low-pressure torches. The main key actuates the heavy spring, and the micrometer adjustment key a fine bronze spring that enables the operator to obtain pressures up to 5 pounds per square inch, in addition to the adjustment secured with the standard adjustment key.

♦ ♦ ♦

Weights of individual sheets or black plate at an Ohio plant now are being determined automatically by a machine capable of sorting the sheets into three weights—light, medium and heavy. The unit which consists of the feeding, weighing and discharging mechanisms, will handle sheets from 30 x 40 inches at the rate of 1500 an hour, or 12 base boxes, to sheets 14 x 20 inches, 16 base boxes, at the rate of 1800 an hour. A duplex machine now being built will have a capacity for handling 3400 sheets an hour.

STAINLESS STEEL

where you need it to resist corrosion

CARBON STEEL

for strength and economy

USS PLYKROME

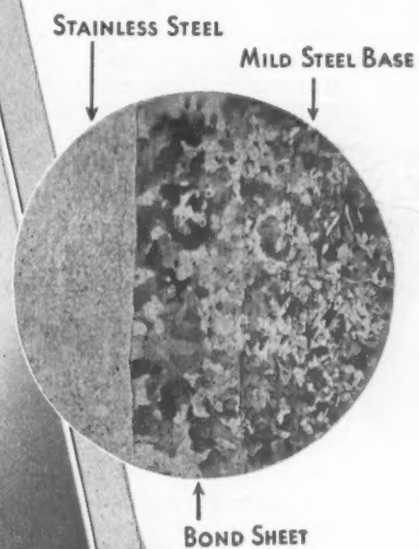
Logical isnt it?

IT was inevitable that engineering skill would develop an economical way to utilize the corrosion resistant qualities of Stainless Steel.

But it was not until the development of Plykrome that users could be sure of a stainless-clad plate that was proof against splitting or separation of the plies, and that was not affected by the production processes.

Plykrome is unique because of its use of a bond sheet between the stainless steel veneer and the carbon steel base. This assures a perfect bond and excludes all carbon from the stainless steel. Hence its corrosion resistance is precisely that of solid stainless steel.

Write us today for information and suggestions on the application of Plykrome to your needs.



Illinois Steel Company

208 SOUTH LA SALLE ST. CHICAGO, ILLINOIS

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

U S S CHROMIUM-NICKEL ALLOY STEELS ARE PRODUCED UNDER LICENSES OF THE CHEMICAL FOUNDATION, INC., NEW YORK, AND FRIED. KRUPP A. G. OF GERMANY

NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Spray Nozzle Finds New Uses In Cleaning, Washing

Chain Belt Co., Milwaukee, has announced new applications for its spray nozzle. These include washing anthracite coal, crushed stone, silica sand, and cleaning steel plates (descaling in rolling mills), sluicing ashes, etc. Low water consumption is obtained by unique design of the nozzle, whereby a round stream hits a curved deflector plate with retaining sides. The result is a flat spray, free from mist, with all of the water directed toward the material to be cleaned. Two sizes are available.

◆

Proportioning System Controls Industrial Furnaces

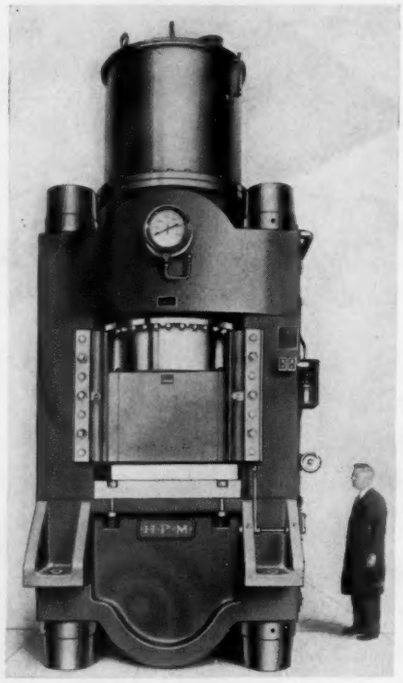
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has developed an all electric proportioning system involving the use of the unit shown herewith. As successfully installed in a number of sheet and pair furnaces, this system can be completely automatic or it can give the heater rheostat control for remotely changing the fuel valve opening so that the pressure will be varied to suit his observation of furnace atmosphere. In addition, the proportioning system is employed to regulate automatically the flow of gaseous or liquid fuel and air to maintain the rate of combustion needed for uniform temperature.

Movements of the valve in the Minneapolis-Honeywell proportioning system for industrial furnace regulation, are modulated so that its amount of opening is proportional to the changes in temperature

◆

Production Stamping Press Is Heavy-Duty Type

Hydraulic Press Mfg. Co., Mt. Gilead, O., is manufacturing a heavy-duty production stamping press designed particularly for heavy sheet metal stamping, forming, embossing and other similar die work. A modern hydraulic power transmission is employed in the operation of this unit, shown herewith, converting the energy of an electric motor directly into a tremendous pressure force, without gears, cranks or other such mechanical devices.



Heavy-duty stamping press developed by Hydraulic Press Mfg. Co.

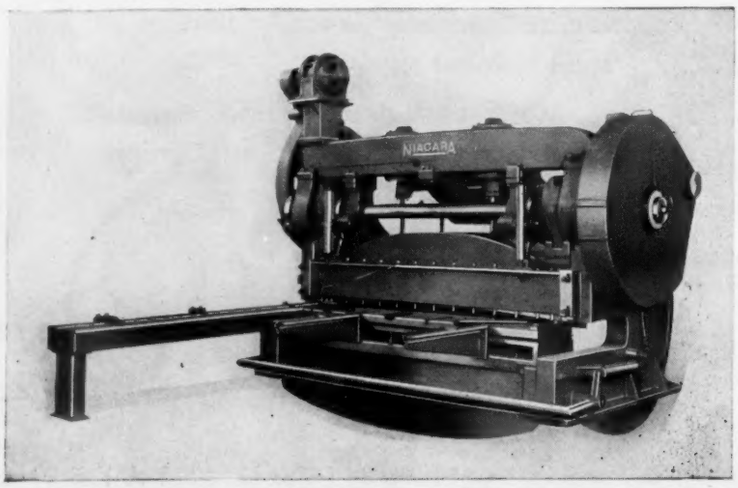
Pressing cycle may be carried out in complete automatic sequence, making single strokes or running continuously, according to the setting of the electrical control. Two hand electric pushbutton starting is standard. Other outstanding features include massive box-type uprights with forged steel tie rods shrunk in place. The slide is guided at each corner by long gibs adjustable front and back. Normal pressure capacity is 1500 tons; the same unit is built in a series of standard sizes and pressures ranging from 100 to 2000 tons.

◆

Develops New Shears For Heavy Plate

Niagara Machine & Tool Works, Buffalo, has placed on the market a new M series shears, shown herewith, for shearing heavy plate. A feature is the independent chuck carrying the lower knife. This construction permits permanent location of the bed and facilitates adjustment for proper knife alignment. Another feature is the holddown. Each foot of this device is arranged with an individual spring cushion. The feet are self-adjusting for different thicknesses of material, building up pressure as the thickness of material increases. Sheets of shorter length than the maximum cutting length of the shear are gripped with uniformity without tilting the holddown.

The shear may be used for cutting full capacity plate at one end and light gage plate at the other in the same stroke. A powerful jaw clutch with hardened tool steel inserts on both striking and backlash surfaces, drives the main shaft.



Niagara shears has independent chuck carrying lower knife

Working Off Old Contracts Holds Steel Rate

Fresh Buying Light, but Shipments Heavy — Rail Makers Dismayed by Proposal of Washington for $35 Price—September Pig Iron and Ingots Off—Strike Effects Localized

NOTWITHSTANDING labor difficulties, Pittsburgh district steel mills last week put on enough additional capacity to cancel operating losses in the Buffalo, Wheeling and New England districts and hold the national steel average at 38 per cent.

This first break in a seven-week decline in production resulted from pressure for deliveries against third quarter contracts, which the steel code requires to be effected by Oct. 15. This tonnage is chiefly for stock in anticipation of advancing prices and possible strike interruptions.

In all lines of iron and steel, new business the past week was negligible, which is no unusual occurrence following the turn of a quarter and the conclusion of the contracting period. In a week or ten days mills will have shipped their third quarter obligations and be dependent upon strictly current consuming requirements, minus whatever withdrawals are made from stock.

While labor generally is restive, only in the Weirton and immediate Pittsburgh districts have there been disturbances and shutdowns. Some Pittsburgh mills closed rather than subject loyal employes to intimidation. The rise in the Pittsburgh district operating rate last week from 30 per cent to 38, with 40 per cent probable this week, evidences the minor effect upon production.

The fuel situation, however, remains tense. In the week ended Sept. 30 no Connellsville beehive coke was made, the first blank week in 53 years. The deficiency in fuel has been supplied by West Virginia and Kentucky mines. New quotations on coke, expected this week following a determination of coal, are certain to be sharply higher and to affect iron and steel prices. In the Birmingham district an advance of 25 cents was posted last week.

Whatever enthusiasm has been kindled by the prospect of 844,525 tons of rails and 245,221 tons of track fastenings being placed, largely through government financing, is neutralized by the pressure of Railroad Co-ordinator Eastman on prices. A reduction to $35 a ton, specified as the minimum acceptable, is equivalent to 1.52c per pound for a product which is practically a specialty, compared with a present Pittsburgh market of 1.70c on tank plates and structural shapes, 1.75c on commercial carbon bars and hot-rolled strip, and 1.95c on cold-finished bars.

This 1,089,746 tons of track material would entail the pouring of about 1,300,000 tons of ingots, and at the present rate of operation would increase production 8 points if concentrated over a period of three months.

An equipment program, being shaped up at Washington, is regarded with brighter interest, as material requirements would cut across more lines than track material. Last week Armour & Co. placed 500 underframes, requiring 2500 to 3000 tons of steel. September freight car awards, at 23, pushed the nine-month total for 1933 up to 1097, compared with 1687 a year ago.

While structural awards last week were only 14,984 tons, against 26,981 tons in the week preceding, they were close to the year's weekly average. For navy requirements, 2500 tons was placed and 4000 tons offered for bids. Seventeen barges, totaling 2500 tons of plates, have been awarded. General Motors has recognized the new higher prices on sheets on a small buy.

Despite a reduction of 15 per cent, the daily rate of pig iron production in September was almost three times that of September, 1932. Last month's daily average was 50,264 gross tons, compared with 59,137 tons in August and 19,788 tons in September a year ago. The month's total of 1,507,931 tons gave 9,587,291 tons for the first nine months of 1933, against only 6,856,487 tons in the comparable period of 1932. A net loss of nine left 89 stacks active out of 289.

In steel ingots the decline in September was 17 per cent, the daily rate of 88,884 tons giving the month an average of 40.9 per cent, contrasted with the present rate of 38. Rates for various districts last week were: Pittsburgh 38, Youngstown 55, Chicago 48, Cleveland 54, Wheeling 35, Buffalo 29, eastern Pennsylvania 31½, Detroit 45½, New England 72½ and Birmingham 34.

Price changes were numerous in warehouse markets last week, these adjustments following the mill market, but mill prices and scrap were steady. A $3 rise in common iron bars and cold-finished bars is rumored. New bolt and nut discounts, probably lower, await the new code.

All indexes of STEEL were stationary last week, iron and steel at $31.60, finished steel at $49.20, and scrap at $10.58.

COMPOSITE MARKET AVERAGES

	Oct. 7	Sept. 30	One Month Ago Sept., 1933	Three Months Ago July, 1933	One Year Ago Oct., 1932	Ten Years Ago Oct., 1923
Iron and Steel Composite	$31.60	$31.60	$31.30	$29.81	$29.32	$43.84
Finished Steel Composite	49.20	49.20	48.52	47.20	47.64	67.77
Steelworks Scrap Composite	10.58	10.58	10.83	10.66	6.96	14.25

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Oct. 7, 1933	Sept. 1933	July 1933	Oct. 1932
Finished Material				
Steel bars, Pittsburgh	1.75	1.60	1.60	1.60
Steel bars, Chicago	1.80	1.65	1.70	1.70
Steel bars, Philadelphia	2.04	1.91	1.91	1.91
Iron bars, Chicago	1.60	1.60	1.65	1.65
Shapes, Pittsburgh	1.70	1.60	1.60	1.60
Shapes, Philadelphia	1.90	1.81½	1.65	1.75
Shapes, Chicago	1.75	1.65	1.70	1.70
Tank plates, Pittsburgh	1.70	1.60	1.60	1.60
Tank plates, Philadelphia	1.88	1.79½	1.49½	1.79½
Tank plates, Chicago	1.75	1.65	1.70	1.70
Sheets, No. 10, blue anneal., Pitts.	1.75	1.70	1.75	1.70
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.10
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.80
Sheets, No. 10, blue anneal., Gary	2.00	1.90	1.90	1.80
Sheets, No. 24, hot ann., Gary	2.35	2.35	2.35	2.20
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.85
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Wire nails, Pittsburgh	2.10	2.10	2.05	1.95
Tin plate, per base box, Pitts.	4.65	4.65	4.25	4.75
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00

	Oct. 7, 1933	Sept. 1933	July 1933	Oct. 1932
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	17.86	15.76
Basic, valley	17.00	17.00	15.60	14.00
Basic, eastern, del. eastern Pa.	18.19	17.76	16.79	13.60
No. 2 foundry, del. Pittsburgh	18.76	18.76	17.36	15.76
No. 2 foundry, Chicago	17.50	17.50	16.75	15.50
Southern No. 2, Birmingham	13.50	13.50	12.60	11.00
No. 2X, Eastern, del. Phila.	18.63	18.63	17.28	14.01
Malleable, valley	17.50	17.50	16.10	14.50
Malleable, Chicago	17.50	17.50	16.75	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.04	23.04
Gray forge, del. Pittsburgh	18.38	18.26	16.93	15.63
Ferromanganese, del. Pittsburgh	87.24	87.24	84.44	73.24
Scrap				
Heavy melting steel, Pittsburgh	$12.75	13.00	12.70	9.50
Heavy melting steel, eastern Pa.	10.50	10.70	12.00	7.25
Heavy melting steel, Chicago	9.75	10.00	10.45	6.00
No. 1 wrought, eastern Pa.	10.75	11.60	13.00	7.25
No. 1 wrought, Chicago	9.25	9.25	10.20	5.60
Rails for rolling, Chicago	11.25	11.25	11.15	8.00
Coke				
Connellsville, furnace, ovens	2.50	2.50	2.40	2.00
Connellsville, foundry, ovens	3.25	3.15	2.85	2.75

CURRENT FINISHED STEEL PRICES

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88½c
New York, del.	2.08c
Phila., del.	2.04c
Birm., base	1.90c
*St. Louis, del.	2.07c

HOT ROLLED ANN. No. 10

Pittsburgh, base	1.90c
Gary, base	2.00c
Chicago, del.	2.03½c
Phila., del.	2.19c
New York, del.	2.23c
*St. Louis, del.	1.97c
Birm., base	2.05c
F.o.b. cars, dock Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38½c
New York, del.	2.58c
Phila., del.	2.54c
Birm., base	2.40c
*St. Louis, del.	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98½c
Phila., del.	3.14c
New York, del.	3.18c
Birm., base	3.00c
*St. Louis, del.	3.17c
San Fran., f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.50c
Gary, base	2.60c
*St. Louis, del.	2.82c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Gary, base	2.40c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Gary, base	2.85c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pitts., No. 10	2.45c
Pitts., No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh

Tin plate, coke base, contract	$4.65
Do., stock	4.05
Long ternes, No. 24 unassorted	2.90c

Gary base, 10 cents higher.

Corrosion, Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Phila., del.	1.88½c
Boston, del.	2.10c
Buffalo, del.	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birm., base	1.85c
Coatesville, base	1.80c
Sparrows Point, base	1.80c
Pac. Coast, f.o.b. cars, dock	2.25c
*St. Louis, del.	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birm., base	1.85c
Pac. Coast, f.o.b. cars, dock,	2.25c
Do., wide flange	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birm., base	1.90c
Buffalo, base	1.85c
Pac. Coast ports, cars, dock, c.i.f.	2.10c
Cleveland, base	1.80c
Philadelphia, del.	2.04c
Boston, del.	2.19c
New York, del.	2.08c
San Fran., f.o.b. cars, dock	2.30c
Pitts., forg. qual.	1.85c

RAIL STEEL
To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Chicago, base	1.60c
*Philadelphia, base	1.74c
Pitts., refined	2.70c to 7.50c

REINFORCING
New billet

Pittsburgh, cut lengths	1.90c
Chicago, Youngstown, O., Birmingham, Ala., Cleveland, Buffalo	1.95c
Gulf ports	2.20c
Pacific coast ports	2.35c
Phila., del.	2.19c

Rail steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Gary, Ind., Youngstown, O.	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices apply on carload lots. Mixed carloads 10 cents higher; joint carloads up 20 cents; less carloads up 30 cents. Nail extras subject to 10 per cent discount on straight or mixed carload shipped to single consignee.)

Base, Pitts.-Cleve.
(Per 100 lb. keg)

Standard wire nails	$2.10
Cement coated nails	2.10
Galvanized nails	3.60

(Per pound)

Polished staples	2.80c
Galvanized fence staples	3.05c
Barbed wire gal.	2.60c
Annealed fence wire	2.25c
Galvanized fence wire	2.60c
Woven wire fencing (base column, c.l.)	$55.00

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.10c

Anderson, Ind., and Chicago, $1 over Pitts.-Cleve.; Duluth, $2 higher; Birmingham, Ala., $3 higher.

Spring wire	3.10c

Chicago and Waukegan $1 higher. Worcester $2 higher.

Cold-Finished Bars □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs	1.90c
60,000 to 99,999 lbs	1.85c
100,000 lbs. and over	1.82½c

Chi., Cleve., Buff., 5c up; Detr., 20c up; East. Mich., 25c up.

Shafting □ □

(Turned and ground)
Pittsburgh base.

1⅛-inch	3.25c
1⅛ to 1½-inch	2.75c
1⅝ to 1⅞-inch	2.60c
1⅞ to 2⅞-inch	2.45c
2⅞ to 6-inch	2.30c

Alloy Steel □ □

Hot rolled, f.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O., 2.45c. F.o.b. Bethlehem, Pa., 2.55c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.30
2500	2.25	3400	3.20
4100	.15 to .25 Mo		0.50
4600	.20 to .30 Mo. 1.25-1.75 Ni.		1.05
5100	.80-1.10 Cr.		0.45
5100	Cr. spring		0.20
6100	bars		1.20
6100	spring		0.95
Cr., Ni., Van.			1.50
Carbon van.			0.95
9250	(flats)		0.25
9250	(rds., sq.)		0.50

Strip, Hoops, Bands □

Hot-rolled strip up to 23 15/16-in. wide, Pitts.	1.75c
Do., Chicago	1.85c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
*Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip Pitts., Cleve.	2.40c
Worcester, 3 tons or over	2.60c

Rails, Track Material □

Stand. rails, mill	$40.00
Relay rails, Pitts. (Gross Ton)	
20-45 lbs.	$24.50
50-75 lbs.	$20.00
80-100 lbs.	$23.50
Light rails, billet qual., Pitts., and Chicago	$32.00
Do., reroll. qual.	$31.00
Angle bars, mills	2.55c
Spikes, R. R., Pitts.	2.40c
Track bolts, base	3.40c
Tie plates, Pitts.	1.90c
Tie plates, Chi.	1.90c

Base, railroad spikes 200 kegs or more; base tie plates, 20 tons or more; differentials for less.

Base, light rails, 25 to 40 pounds; 50 to 60 pounds inclusive, $5 extra; 16 and 20 pounds, $1 extra; 12 pounds, $2 extra; 8 and 10 pounds, $5 extra.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots, Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	73 off
Rolled thread, ½ x 6 and smaller	73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	73 off
Tire bolts	60 off
Stove bolts, 72½-25-10 off in pkgs.; 85 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller, 73 off.	
Step Bolts	70 off
Elevator bolts	70 off

NUTS

Semifinished	73 off

HEXAGON CAP SCREWS

Milled	85 off
Upset 1-in., smaller	85-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	80 off
Upset, larger than 1-in.	80 off
Headless set screws	75-10 off

Rivets, Wrought Washers

Struc. c.l., Pitts-Cleve.	2.50c
Struc., c.l., Chi.	2.60c
7/16-in. & smaller, Pitts., Chi., Cleve.	70, 10 and 5 off

Wrought washers, mill 6.00 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.00
Do., less than 5 kegs; no discount on size extras	$3.15
Steel piling, Pitts.	1.90c
Steel piling, Buff.	2.00c
Steel piling, Chi.	2.00c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Gary, Ind., Lorain, O., to consumers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

LINE PIPE

Steel

⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½
9—10, lap weld	66
11—12, lap weld	65

Iron

¼—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra. 2-inch line discount unchanged from list prior to April 15, 1933.

BOILER TUBES

C. L. Discounts, f.o.b., Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3¾	50	3	17
4	52	3¾—3½	18
4½—6	42	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Quantity discounts, same as for hot rolled below. Charcoal Iron—Under 10,000 pounds; 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

Cold Drawn

2—2¼	27	3¼—3½	44
2½—2¾	34	4	46
3	41	4½, 5, 6	36

(On 1—1¾-inch sizes mechanical tubing discounts apply.)

Hot Rolled

2—2¼	33	3¼—3½	50
2½—2¾	40	4	52
3	47	4½, 5, 6	42

Quantity discounts are: Under 10,000 pounds, 10 points and 5 per cent; 10,000 to 24,999 pounds, 6 points and 5 per cent; 25,000 pounds to carload, 2 points and 5 and 5 per cent; carload and over, base discount and 5 and 5 per cent. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$35.00-36.00
4-in., Birm.	38.00-39.00
*4-in. Chicago	46.00-47.00
*6 to 24-in. Chicago	43.00-44.00
6-in. & over, N. Y.	34.50-36.50
4-in. New York	36.50-38.50

Class A pipe $3 over Class B. Stand. fitgs., Birm. base..$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

RAW MATERIAL PRICES

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½%, Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic, 56-63%, con. (nom.)	8.00- 9.00
Cop-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nom.)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50
No. Afr. low phos.	7.00
Swedish basic, 65%	8.00
Swedish lo wphos.	8.50
Spanish, No. Afr. basic, 50 to 60%	7.00
Tungsten, spot, sh. ton unit, duty pd.	$12.25-12.50
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton c.i.f.	$17.00-18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasion, 52-55%	22.00
So. African, 52%	21.00-22.00
So. Afr., 49-51%	20.00-21.00
Indian, 48-50%	nominal

Refractories

FIRE CLAY BRICK
Per 1000 f.o.b. Works
First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet E. Chicago	54.00
Birmingham, Ala.	55.00

MAGNESITE BRICK
Per Net Ton, 9 x 4½ x 2½

Burned	$65.00
Unburned	55.00

CHROME BRICK
Per Net Ton

F.o.b. ship. point	$45.00

MAGNESITE

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

Fluorspar

85 and 5 per cent grade

Washed gravel, duty paid, tide, gross ton	$20.00
Washed gravel f.o.b. Ill., Ky., net ton, carloads	$14.00

Semifinished Steel

Prices Per Gross Ton
BILLETS AND BLOOMS
4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	26.00
Canton, O.	26.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	$35.00
Chicago	36.00

SKELP

All grades, Pitts. and Chicago	1.60c

Coke

Price Per Net Ton
BEEHIVE OVENS

Connellsville fur.	$2.50- 2.75
Connellsville fdry.	3.25- 3.50
(Above prices are nominal)	
Connell. prem. fdry.	4.50
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi. ov., outside del.	8.00
Chicago, del.	8.75
New England, del.	10.50
St. Louis, del.	8.25
*Birmingham, ovens	4.75
Indianapolis, del.	8.75
Ashland, Ky., Connells., basis	5.50
Portsmouth, ovens, Connell. basis	5.50
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty pd.	82.00
del. Pitts.	87.24
Spiegeleisen, 19-20%, dom., fur., spot†	27.00
Ferrosilicon, 50%, frieght all., c. l.	74.50
Do, less carload	82.50
Do, 75 per cent	120-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	85.00
2% carbon	90.00
1% carbon	100.00
Ferrodhrome, 66-70 chromium, 4-6 carbon, cts. lb con. del.	9.50
Do, spot del.	10.00
Ferrotungsten, stand., lb. cont.	0.94-1.00
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.60- 2.80
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton., frt., all., lb.	7.00
Do, under 1 ton	7.50
Ferrophosphorus, per ton, c. l. 17-19%, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25

Gross Tons

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$17.50	$18.00	$17.00	$18.50
Birdsboro, Pa.	17.50	18.00	17.00	18.50
Swedeland, Pa.	17.50	18.00	17.00	18.50
Sparrows Point, Md.	17.50	18.00	17.00	18.50
From Swedeland, Pa., del. to Phila.	18.26	18.76	17.76	.....
From Bethlehem, del. to Brooklyn	19.77	20.27	.....	.....
From Bethlehem, del. to Newark, N. J.	18.99	19.39	.....	.....
Basing Point:				
Everett, Mass	18.00	18.50	17.50	19.00
*From Everett, del. to Boston	18.50	19.00	18.00	19.50
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
*From Buffalo, del. to Boston	18.50	19.00	18.00	19.50
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.50	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh	(Neville Island base, plus 50 to 76 cents switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18 00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	(Granite City base, plus 56 to 75 cents switching charges)			
Basing Point:				
Birmingham, Ala.	13.50	.....	12.50	.....
From Birmingham del. to:				
*Boston	18.12	.....	17.62	.....
Newark, N. J.	18.51	.....	.....	.....
Brooklyn, N. Y.	19.39	.....	.....	.....
Baltimore	18.02	.....	17.52	.....
Cleveland	19.64	.....	18.64	.....
Cincinnati	18.23	.....	17.11	.....
Chicago	18.16	.....	19.14	.....
*St. Louis	17.62	.....	17.50	.....
Basing Point:				
Provo, Utah	16.50	.....	.....	.....

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$22.00. Basing point: Johnson City, Tenn.—.....

Philadelphia, standard and copper bearing 23.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson County, O., base: 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base: 10%—27.25; 11—$28.75; 12—$30.25; 13—31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Bars

Recent Heavy Covering Puts Damper on Market — Iron and Cold-Finished Advanced

BAR PRICES, PAGE 54

Cleveland—As the result of extensive covering for fourth quarter before Sept. 30, when the price of commercial steel bars was advanced $3 a ton to 1.80c, base, Cleveland, new purchasing has slowed. A leading producer here has not yet booked any material at the new price, and in other directions orders are small and scarce. Bar mill operations here have tapered to 45 per cent. Reflecting a decline in consumption, shipments also have diminished, less material being taken by the automotive industry now than in several months. Specifications from railroad and miscellaneous consumers are slow to improve.

Pittsburgh—Bar producers entered fourth quarter with considerably heavier unfilled tonnage but during the week booked little business at 1.75c, Pittsburgh. Heavier bar mill schedules are caused by necessity of completing shipments on third-quarter contracts by Oct. 15.

Chicago—Soft steel bar sales and specifications are lighter, following fairly heavy business at the conclusion of the quarter. Buyers have been conservative in placing fourth quarter requirements, in view of code regulations. Consumption by the automotive industry remains fairly heavy. Soft steel bars now are 1.80c, Chicago, on new business, with rail steel bars 1.70c. Bar iron continues 1.60c.

Boston—Commercial steel bar activity has subsided following a mild covering flurry previous to the $3 advance to 1.85c, Buffalo. Unless operating schedules pick up with shipments against contracts, this quarter will be light. Rail steel merchant bars have also advanced, to 1.75c, Buffalo.

New York — An advance of $3 on common iron bars may be filed soon, it is reported here. This would bring the market here for most sellers to 1.93c. New differentials are generally being applied to quantities of a size as follows: Under 1000 pounds, 50 cents; 1000 pounds to 1999 pounds, 20 cents; no extras for 2000 pounds and over. An increase in cold-finished bar base price also is indicated. Commercial steel bar demand is quiet, following recent contracting at old prices. The current market is 1.75c, Pittsburgh, or 2.08c, New York.

Philadelphia—An increase of $3 a ton on cold-finished bars is expected to be filed shortly, bringing the market up to 2.10c, Pittsburgh. A similiar increase may also be made in common iron bars, which are now being quoted by most sellers at 1.74c, the equivalent of 1.45c, Pittsburgh, plus the 29-cent carload freight rate.

Wire Activity Is Less

Wire Prices, Page 55

Chicago—Wire sales and specifications are slow and little improvement is noted in buying or shipments. Jobbers are slow to make new commitments and some manufacturers' wire consumers are operating at lower schedules. Prices are unchanged at $2.15 for wire nails and 2.15c for plain wire.

Pittsburgh—Unchanged Pittsburgh base prices on all wire products continued last week. Buying is less than a month ago and considerably under the July peak, but shipments are steady and producers have fair backlogs.

Cleveland—Shipments are holding up fairly well, but backlogs are being reduced rapidly, as new orders are diminishing. Nut and bolt manufacturers are buying less material.

Tin Plate Orders Steady But Schedules Are Reduced

Tin Plate Prices, Page 54

Pittsburgh—Because of the continuing strike in the two tin plate plants of Weirton Steel Co., and the adoption of 15-turn weeks by other producers, the average of tin mill operations in the Pittsburgh district is no higher than 80 per cent. The 15-turn week provides 40 working hours, and represents a scaling down of one and two turns, which had been worked prior to the adoption of the steel code. Orders for tin plate continue in steady volume.

Cold-Finished Orders Off

Cold Finished Prices, Page 55

Pittsburgh — Cold-finished steel bar orders are declining, although shipments are comparable with early September or late August. Fourth quarter contracting has been at 1.95c, Pittsburgh, base, or 2.00c, Cleveland, Chicago and Buffalo. Turned and ground shafting prices are unchanged from the Aug. 1 advance but are now based on Pittsburgh instead of Cumberland, Md.

Plates

Barges and Naval Vessels Give Best Tonnages — Current Buying at Light Rate

PLATE PRICES, PAGE 54

Cleveland—The Cleveland plate mill has stepped up operations from around 45 per cent to approximately 60 per cent, mainly to fill specifications on third quarter contracts by Oct. 15. Heavy covering at 1.60c, base, Pittsburgh, just prior to the $2 a ton price advance Sept. 30, also provided producers with good backlogs, some of which tonnage now is being rolled. New business, however, has subsided, and the 5000 tons of plates for Cleveland watermains have not yet been placed.

Pittsburgh—Closing of some ten barges, requiring 1600 tons of plates, for a Cincinnati buyer will be made shortly, probably this week. Canulette Shipbuilding Co., Slidell, La., will build six cargo barges for the Texas Co., Shreveport, La., division. McClintic-Marshall Corp. will build a 30-ton dredge boat for the Ohio Dredging Co., Pittsburgh. Tank makers report closing on only small jobs and no important inquiries are pending. Tank plates are 1.70c.

Chicago—Oil companies are providing little plate business for tank or refinery repair work, most recent orders being for small miscellaneous projects. Car building continues quiet but there is some hope that railroad car purchases will follow the rail buying program now under way.

Boston—Plate buying at 1.80c, Coatesville, Pa., is light and is expected to continue so for some weeks as steady consumers covered before the advance. Placing of 80 brewery tanks, 300 tons of 5/16-inch plates, features transactions in New England.

New York—Plate sellers here expect the navy to open bids late in October on material for two cruisers,

each requiring 4000 tons of steel, two-thirds plates. One will be built at the Brooklyn navy yard and one at Philadelphia. Buying is light at 1.80c, Coatesville, Pa., 1.98c. New York.

Philadelphia—While most consumers are fairly well covered at old prices, some small scattered lots are being placed at the new quotation of 1.80c, Coatesville, Pa., or 1.88½c, delivered Philadelphia. Approximately 2700 tons of plates will be required for the nine coast guard cutters on which bids will be opened in Washington Oct. 9 and Oct. 25.

Contracts Placed

800 tons, six cargo barges for Texas Corp., to Canulette Shipbuilding Co., Slidell, La. Contract noted briefly in STEEL, Sept. 25, as going to unstated.

610 tons, for Norfolk, Va., naval base; 210 tons to Carnegie Steel Co., Pittsburgh, 200 tons each to Bethlehem Steel Co., Bethlehem, Pa., and Inland Steel Co., Chicago.

300 tons, tanks Harvard Brewing Co., Lowell, Mass., to Graver Tank & Mfg. Corp., East Chicago, Ind., through W. Mortenson, New York, engineer and contractor.

210 tons, Mare Island, Calif.; to unnamed interest.

175 tons, three gates for Pine Canyon dam, Pasadena, Calif., to Western Pipe & Steel Co., Los Angeles.

150 tons, 35,000-barrel tank, Atlantic Refining Co., Franklin, Pa., to Miles P. Brown Boiler Works, Franklin, Pa.

100 tons, oil barge, 100 x 30 x 8 feet, Studerus Oil Co., Kearney, N. J., to United Dry Docks Inc., Staten Island, N. Y.

Contracts Pending

3150 tons, approximately, for nine coast guard vessels requiring about 350 tons each of plates and shapes; bids Oct. 25 at Washington.

1600 tons, ten standard coal barges, for Ohio River Co., Cincinnati, O.

600 tons, plates and shapes, two tenders, lighthouse bureau; Moore Dry Dock Co., Oakland, Calif., low on HOLLYHOCK; Boston navy yard low, estimated, on TAMARACK; bids Sept. 28.

600 tons, Liberty Brewing Co., Brooklyn, N. Y.

200 tons, three 250-horsepower boilers, naval base, San Diego, Calif., bids opened.

Unstated tonnage, for 100,000-gallon tank and tower, Ocean Beach, N. Y.; bids Oct. 16.

Strip

Consumer Needs Covered; Mills Busy on Shipments

Strip Prices, Page 55

Pittsburgh—Production in several strip steel mills in this district has been severely affected by coal and steel strikes. This complication arises when producers are obliged to complete shipments on all third quarter contracts by Oct. 15. Since Oct. 1, bases of 1.75c, Pittsburgh, on hot-rolled strip and 2.40c, Pittsburgh, on cold-rolled strip, have been uniformly quoted.

Chicago—Consumers are deferring placing of new contracts, especially of both hot and cold-rolled material for cold-rolled strip, which has been advanced sharply, while consumption has tended downward.

Cleveland—New orders here are limited to small lots, mainly for balancing stocks. Shipments are heavy on low price third quarter contracts, which mills expect to complete by Oct. 15. Considerable tonnage for delivery over fourth quarter is expected to be placed this month. Some automobile companies now are negotiating for their requirements on the basis of the new prices at 1.75c, Pittsburgh, for hot-rolled, and 2.40c, Cleveland, for cold-rolled.

Boston — Cold-rolled strip shipments are heavy and most tonnage taken before the advance to 2.60c, Worcester, will be out of the mills by the latter part of this week.

Philadelphia—With most consumers covered for present needs, buying of strip is quiet. Hot strip is 1.75c, Pittsburgh, and cold strip 2.40c, with the carload freight rate 31 cents.

Sheets

Market Is Quieter, Though Shipments Are Heavy—General Motors Buys at New Prices

SHEET PRICES, PAGE 54

Cleveland—General Motors units have placed fairly substantial orders for sheets for new models, at the advanced prices, including 4000 tons with one mill producer. This represents the most important buying at the new sheet schedules. Other consumers who could not foresee all their requirements when tonnage might have been placed at lower figures early in September have been buying moderately. The volume of business, however, is off considerably. Stove and barrel manufacturers are busier. Sheet mills here and in an adjacent lake district continue to operate at capacity to complete shipments on third quarter releases by Oct. 15. Tension, however, is relaxing, as some other mill interests represented here have practically filled old contracts.

Pittsburgh—Asking prices of 2.30c and 2.75c on the two gage bases of cold-rolled sheets, largely supplied to the automotive trade, are untested. With completion of shipments under old contracts by Oct. 15, however, it is expected buyers will re-enter the market soon. Common grades of sheets continue in best demand, but occasionally fair-size specifications for electrical sheets and other specialties are released. Producers are entering October with fairly heavy backlogs, although in general sheet buying is on the decline and reflects present uncertainties.

Chicago—While sheet production continues heavy, new business is light. Shipments against old contracts are supposed to be completed by Oct. 15, but in view of the heavy tonnage on books, some of this material may not be delivered until later. The outlook for renewed buying is uncertain.

Boston—Sheet shipments on old contracts have been practically completed to consumers in this territory. Advance buying is light, although some spot demand has developed. Prices are unchanged, with quantity extras in effect on less than carload shipments.

New York—Sheet sales are light, with prices firm.

Philadelphia—Autobody manufacturers in this district are said to interpret the Iron and Steel institute's resolution No. 13, affecting prices at Detroit, as a discrimination. An effort is being made to rectify this situation. Specifications generally are light, with most consumers well protected for immediate requirements with tonnage released on old contracts. Sellers look for little fresh buying this month. Prices are firm.

Cincinnati—Production in this district held close to 60 per cent during the week, although backlogs have virtually been cleaned up. New bookings are retarded by consumers' inventories. Demand from automotive builders for new models has not developed in seasonal volume.

St. Louis—Although sheet sales have tapered, producers and distributors are confident of renewed demand toward the close of October. Removal of freight surcharges has resulted in the following delivered prices in St. Louis: No. 24 hot rolled annealed, 2.57c; No. 24 galvanized, 3.17c; and tin mill black, 2.82c, a reduction of 0.02c under previous prices.

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Structural Shapes

Market More Active—Over 4000 Tons Are Awarded at Chicago—2500 Tons Placed for Destroyers—Pacific Coast Navy Yards To Take 4000 Tons; Cars, 2500

STRUCTURAL SHAPE PRICES, PAGE 54

Chicago—Fabricated shape awards total more than 4000 tons, while 2500 to 3000 tons will be required for 500 car underframes placed by Armour & Co. Bids are in on 2757 tons of piling for a breakwater at Indiana Harbor, and this tonnage is expected to be divided among several producers. Four mills shared in the 7809 tons for the breakwater in nearby Calumet harbor. Low bidders have been announced on three locks and dams on the Mississippi river, and urgency to increase employment is expected to push awards for this work. Among new inquiries are two Illinois bridges, each requiring 1500 tons, and a machine shop for a Pacific coast navy yard taking 4000 tons. Youngstown Sheet & Tube Co. has divided 1000 tons for mill buildings at Indiana Harbor, while 1300 tons have been placed for a bridge superstructure at Morris, Ill.

Pittsburgh — On several small structural shape orders, 1.70c, base, Pittsburgh, has been applied. Most large users have fourth quarter contracts entered at the late third quarter price. A large fabricator is reported favoring stocking about 10,000 to 12,000 tons of standard structural sections on its contract protection, to guard against the immediate buying at the higher price when its contract expires. Improvement is noted in the number of small jobs. River dam and lock work in three pending jobs in this district involve approximately 4500 tons of fabricated structural steel.

Cleveland—Protections for 60 days asked by fabricators for bidding on specific jobs indicate a considerable number of small projects are being negotiated. Plain material now is figured on a basis of 1.88½c, delivered, Cleveland. Bids went into the Ohio highway department, Columbus, Oct. 6, on 535 tons for a bridge at Leavittsburg, and 140 tons for a bridge in Stark county, the largest projects pending.

Boston — Bridge steel demand is heavier, with 2000 tons active. Several larger bridges will be out shortly. Bids are being taken on additional federal work.

New York—Federal projects are requiring more structural steel in the East. Award of 1800 tons for the Staten Island marine hospital several months ago to a Bethlehem, Pa., fabricator has been reaffirmed as the project goes ahead. Early action is expected on the award of steel for the Manhattan postoffice annex.

Philadelphia—Structural work is developing slowly, with fabricators expecting little from government-aid projects this fall. Shapes are 1.80c, Bethlehem, Pa., or 1.90½c, delivered, Philadelphia. Seeds & Durham, this city, are low on dam No. 3, Alleghany river, requiring 1100 tons of new sheet piling and a substantial tonnage of used piling. Delaware is asking federal aid for the construction of more than 25 public schools.

Buffalo—Several thousand tons of structural steel and a large tonnage of reinforcing bars will be placed in the Buffalo district for bridge and highway contracts to be awarded within 30 days.

Contracts Placed

7809 tons, piling for breakwater, Calumet, Ill., divided evenly to Inland Steel Co. and Illinois Steel Co., Chicago; Carnegie Steel Co., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa. This is a revision of the report of tentative placing last week.

2500 tons, for ten destroyers, navy, divided to Bethlehem Steel Co., Bethlehem, Pa.; Carnegie Steel Co., Pittsburgh; John T. Hill, Baltimore; Joseph P. Cattie & Bros., and Enterprise Galvanizing Co., Philadelphia.

1300 tons, superstructure, Morris, Ill., bridge, to McClintic-Marshall Corp., Bethlehem, Pa.

1000 tons, mill buildings, Youngstown Sheet & Tube Co., Indiana Harbor, Ind.; divided between Wisconsin Bridge & Iron Co., Milwaukee, and Joseph T. Ryerson & Son Inc., Chicago; 600 tons of steel to be furnished by Youngstown Sheet & Tube Co.

875 tons, piling, bulkhead and wing walls, Port Isobel, Tex., to Carnegie Steel Co., Pittsburgh.

680 tons, state bridge over Russian river, Sonoma county, California, to Judson-Pacific Co., San Francisco.

620 tons, pre-cooling plant, refrigerating steamship lines in South, to Dietrich Bros., Baltimore.

540 tons, piling, Norfolk, Va.; 180 tons each to Bethlehem Steel Co., Bethlehem, Pa.; Carnegie Steel Co., Pittsburgh; and Inland Steel Co., Chicago.

495 tons, storage and garage building for *Daily News*, New York, to Post & McCord Inc., New York; through Hegeman-Harris Co.

475 tons, bridge, White Pine, Tenn., to Vincennes Bridge Co., Vincennes, Ind.

425 tons, state bridge, United States highway 271, North of Antlers, Pushmataha county, Oklahoma, to Muskogee Iron Works, Muskogee, Okla.; Standard Paving Co., Tulsa, general contractor.

400 tons, bridge, Pawnee, Okla., to Kansas City Structural Steel Co., Kansas City, Mo.

378 tons, overpass, Rock Island railroad, near Bridgeport, Okla., and bridge in Woodward county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.; Nims & Frost, Hydro, Okla., general contractor.

325 tons, building for Swift & Co., West Thirteenth street, New York, to Alpha Iron Works, New York; through Willcox Construction Co.

275 tons, state bridge over Russian river, Mendocino county, California, to Moore Drydock Co., Oakland, Calif.

270 tons, bridge, Salt river, Arizona, to Virginia Bridge & Iron Co., Roanoke, Va.

260 tons, bottling plant, East Thirty-ninth street, New York, to Post & McCord Inc., New York.

250 tons, bridge, substructure, Morris, Ill., including 150 tons of piling, to Wisconsin Bridge & Iron Co., Milwaukee.

225 tons, three spillway gates, Pine Canyon dam, Pasadena, Calif., to Western Pipe & Steel Co., Los Angeles.

225 tons, Kress store building, Meredian, Miss., to Virginia Bridge & Iron Co., Roanoke, Va.

215 tons, bridge, Delaware & Hudson railroad, Greenwich, N. Y., to American Bridge Co., Pittsburgh.

210, grade separation, Westchester county, New York, to Lackawanna Steel Construction Corp., Buffalo; through Neclerio Construction Co., New York.

200 tons, bridge, Grangeville, Idaho, to Illinois Steel Bridge Co., Jacksonville, Ill.

200 tons, sheet piling, immigration station, Gloucester, N. J., to Kalman Steel Corp., Bethlehem, Pa.; through Harry K. Eyre, Philadelphia, general contractor.

190 tons, addition to building 36, National Aniline Works, Grasselli, N. J., to Belmont Iron Works, Philadelphia.

170 tons, state bridge, Winthrop-North Lawrence, N. Y., to American Bridge Co., Pittsburgh; through M. DeGroot, Fort Edward, N. Y.

170 tons, state bridge, South Ann street, Little Falls, New York, to American Bridge Co., Pittsburgh; James H.

Shape Awards Compared

	Tons
Week ended Oct. 7	**14,984**
Week ended Sept. 30	**26,981**
Week ended Sept. 23	**11,930**
This week in 1932	**9,934**
Weekly average, 1932	**14,285**
Weekly average, 1933	**14,258**
Weekly average, Sept.	**14,365**
Total to date, 1932	**622,858**
Total to date, 1933	**584,567**

Small & Co. Inc., Cleveland, general contractor.

160 tons, Mooers village, Clinton county, New York, to Lackawanna Steel Construction Corp., Buffalo; through Lord, Humphrey Co., Malone, N. Y.

160 tons, building, East Sixty-sixth street, New York, for Transboro Realty Co., to Bethlehem Fabricators Inc., Bethlehem, Pa.

160 tons, state bridge, I-beams and trusses, Woodward county, Oklahoma, to Kansas City Structural Steel Co., Kansas City, Mo.; Maxwell Construction Co., Columbus, Kans., general contractor.

150 tons, building, to Duffin Iron Co., Chicago.

135 tons, shapes and bars, bridge between Walters and Frederick, Tillman county, Oklahoma; 94 tons of shapes to Missouri Valley Bridge & Iron Co., Leavenworth, Kans., and 41 tons of bars to Midwest Steel Co., Oklahoma City, Okla.; L. M. Mackey, Bitton, Okla., general contractor.

134 tons, state bridge in Kit Carson county, Nevada, to unnamed interest.

130 tons, bridge, Long Island railroad, Kew Gardens, N. Y., to American Bridge Co., Pittsburgh.

130 tons, stock house addition, National Brewing Co., Baltimore, to Dietrich Bros., Baltimore.

105 tons, bridges, New Mills and Sandy river, Gardiner and Phillips, Me., to Lackawanna Steel Construction Corp., Buffalo; bids Sept. 27.

105 tons, state bridge, Hollow Field, Md., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

103 tons, state bridge, project 164-I, Caddo county, Oklahoma, to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.; Maxwell Construction Co., Columbus, Kans., general contractor.

100 tons, building, Louisville, Ky., to International Steel & Iron Co., Evansville, Ind.

100 tons, Gonzales, Tex., to Virginia Bridge & Iron Co., Roanoke, Va.

100 tons, P street bridge, Rock Creek park, Washington, to Bethlehem Fabricators Inc., Bethlehem, Pa.; Pecora & Gaskill Engineering & Contracting Co., Baltimore, general contractor. Hudson Supply Co., Washington, awarded reinforcing bars.

Unstated tonnage, bridge, Sloanesville, Schoharie county, New York, to Lackawanna Steel Construction Corp., Buffalo, and Kalman Steel Corp., Bethlehem, Pa.; Madison County Construction Co. Inc., Solsville, N. Y., general contractor.

Contracts Pending

15,000 tons, superstructure, midtown postoffice annex, Manhattan (New York), George F. Driscoll Co., Brooklyn, N. Y., low on supplemental bids Oct. 2.

4500 tons, Mississippi river lock and dam, Canton, Mo.; S. A. Healey, Detroit, low on general contract.

4000 tons, machine shop navy yards, Bremerton, Wash.

2600 tons, including 1800 tons piling, lock No. 16, Mississippi river, near Muscatine, Iowa; bids Oct. 24, United States engineer, Rock Island, Ill. Work also takes 178 tons of steel forgings, 60 tons of steel castings and steel pipe, including 1600 feet, 6-inch.

2500 tons, Mississippi river lock and dam, Alma, Wis.; McClintic-Marshall Corp., Bethlehem, Pa., low on steel; United Construction Co., Alma, Ala., low on general contract.

2500 tons, Hogsett locks, Apple Grove,

(*Please turn to Page* 64)

Concrete Bars

Awards Expand, with Placing Of 4000 Tons for Boulder Dam—Indiana and Wisconsin Road Work Also Take Substantial Tonnages—2900 Tons Pend for Three Bridges

REINFORCING BAR PRICES, PAGE 55

Pittsburgh—Demand for new billet steel reinforcing bars is steady, comprising medium-size jobs. Three dams in this district on the Ohio and Big Kanawha rivers will take over 1000 tons. General contract bids on the Pittsburgh postoffice ramps, calling for 500 tons of rail steel, are withheld; specification may be revised. New billet steel bars are based on 1.80c, Pittsburgh, or 1.90c for cut lengths. Rail steel bars for reinforcing are 1.75c, Pittsburgh.

Cleveland—Concrete bars to the amount 800 tons or more are expected to be supplied by a Cleveland mill for the city's easterly sewage disposal plant, award of which is expected shortly. For the Cleveland incinerator, 150 tons have been placed. Except for several pending state highway projects, miscellaneous jobs call for small tonnages. Mill lengths of new billet bars are firm at 1.85c, Cleveland, to distributors.

Chicago—Reinforcing bar sellers are depending largely upon public projects for current business. While Illinois will make its first awards in connection with federal-aid road work the middle of this month, only small bar tonnages will be required, and a large portion of the program will not be carried out until next year. Indiana has placed 400 tons for highway construction and takes bids this week on 367 tons for bridge work. For a Springfield, Ill., power plant, 350 tons will be placed shortly. Wisconsin has awarded 375 tons for highways.

Boston—Reinforcing steel requirements hold the recent slight improvement. An additional 200 tons of mesh has been placed for Rhode Island roads, while 150 tons has been awarded for a New Hampshire bridge. Billet bars, cut lengths, are 1.95c, Buffalo.

New York—Practically all recent pending reinforcing steel for New Jersey highways and bridges has been placed, although some fresh inquiry is out for that state and New York. The bulk of buying is for mesh. Approximately 2900 tons of concrete bars are active for Grand Island bridges at Buffalo, and the Erie railroad bridge at Elmira, N. Y. Billet bars are steady at 1.90c, Pittsburgh.

Philadelphia — Demand remains exceedingly light. James B. Long, engineer, Norristown, Pa., will open bids shortly on eight or ten county bridges for York county, Pennsylvania, but preliminary estimates indicate that the bar requirements will fall short of 100 tons. Billet steel bars in cut lengths are 1.90c, Pittsburgh, or 2.19c, Philadelphia.

Concrete Awards Compared

	Tons
Week ended Oct. 7	**7,516**
Week ended Sept. 30	**2,887**
Week ended Sept. 23	**2,112**
This week, 1932	**5,003**
Weekly average, 1932	**3,920**
Weekly average, 1933	**3,525**
Weekly average, Sept.	**3,365**
Total to date, 1932	**171,277**
Total to date, 1933	**144,521**

Contracts Placed

4000 tons, Boulder dam, Boulder City, Nev., to Colorado Fuel & Iron Co., Denver, 2800 tons, and to Pacific Coast Steel Corp., Los Angeles, 1200 tons.

440 tons, mesh, highways, route 3, section 2B, Secaucus to Moonachie road, Hudson and Bergen counties, New Jersey; and route 6, section 1F, to Hackensack river, Bergen county, to Truscon Steel Co., Youngstown, O.; GUeorge M. Brewster & Sons Inc., Bogota, N. J., general contractor.

400 tons, Indiana road work, to several unstated interests.

375 tons, Wisconsin road work; 175 tons to Truscon Steel Co., Youngstown, O.; balance to unstated interest.

300 tons, highway, Jefferson county, New York, to American Steel & Wire Co., New York; through C. D. Murray Co. Inc., Syracuse, N. Y.

226 tons, state highway work in 16 counties, California, to unnamed interests.

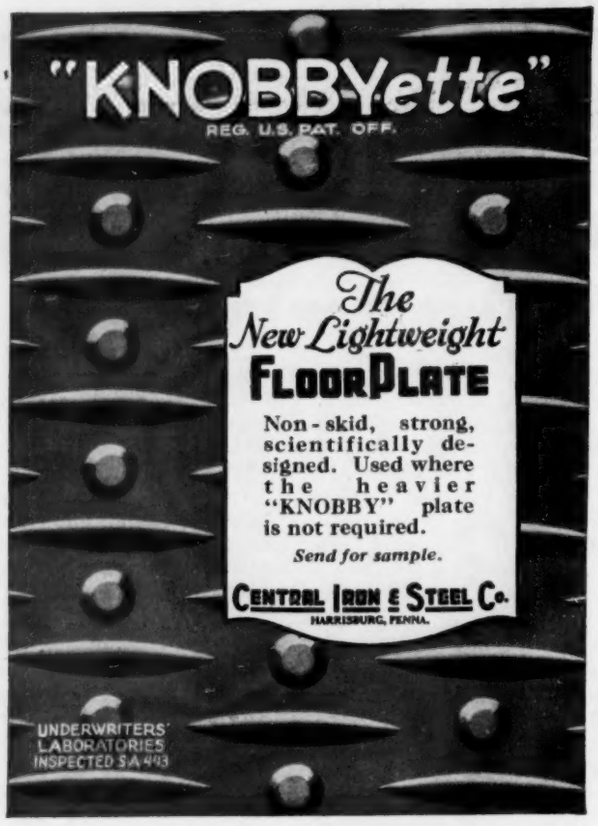
192 tons, state highway work in Los Angeles county, California, to unnamed interest.

165 tons, highway, Dutchess county, New York, to Truscon Steel Co., Youngstown, O.; through A. E. Ottaviano Inc.

150 tons, state bridge over Feather river, Butte county, California, to unnamed interest.

150 tons, state bridge, Landaff, N. H., to Concrete Steel Co., Boston; Kittredge Bridge Co., Concord, N. H., general contractor.

150 tons, incinerator for Cleveland, to Patterson-Leitch Co., Cleveland.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THE MARKET WEEK

145 tons, route 6, section 1E, Ridgefield Park, New Jersey, to Igoe Bros., Newark; George M. Brewster & Sons Inc., Bogota, N. J., general contractor.

138 tons, substructure, Morris, Ill., bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

135 tons, Young's bay bridge, Oregon, to unnamed interests; Lindstrom & Feigenson, Portland, Oreg., general contractors.

128 tons, bridge carrying route 6, section 1-E across tracks, New Jersey & New York railroad, Hasbrouck Heights, N. J., to Igoe Bros., Newark; George M. Brewster & Sons Inc., Bogota, N. J., general contractor.

115 tons, including 55 tons of shapes, bureau of roads bridge, Linn county, Oregon, to unnamed interests.

107 tons, state bridge over Russian river, Mendocino county, California, to unnamed interest.

100 tons, bars and shapes, mainly former, filtration plans and pumping station, Braintree, Mass., to Concrete Steel Co., and A. O. Wilson Structural Co., Cambridge, Mass.; Clark & Smith Inc., Quincy, Mass., general contractor.

100 tons, building, Armstrong Paint & Varnish Co., Chicago, to Concrete Steel Co., Chicago.

Unstated, bureau of roads bridge, Willamette county, Oregon; Kuckenberg & Wittman Co., Portland, Oreg., general contractor.

Contracts Pending

367 tons, Indiana state bridge work; bids Oct. 10.

350 tons, power plant, Springfield, Ill.

331 tons, for delivery to Panama, bureau of supplies and accounts, navy department, Washington; bids Oct. 5.

305 tons, lock No. 16, Mississippi river, near Muscatine, Iowa; bids Oct. 24, United States engineer, Rock Island, Ill.

285 tons, bridges, St. Francis river, Lake City-Monette road, highway 18, Arkansas; bids Oct. 17, Little Rock, Ark.

122 tons, state highway work in San Bernardino county, California; bids Oct. 18.

115 tons, state bridge, Mystic river, Medford, Mass.

110 tons, twin locks, Kanawha river, United States engineer, Huntington W. Va.; Brader Construction Co., New York, low.

101 tons, state highway work, Eagle county, Colorado; bids Oct. 5.

100 tons, bridge, Morris Plains, N. J.; bids Oct. 23. Highway openings same date require 75 tons of mesh, Cape May and Atlantic counties, New York.

Strikes Delay Shipments of Semifinished Steels

Semifinished Prices, Page 56

Prices of sheet bars, billets, slabs, wire rods and other semifinished steels remain unchanged for fourth quarter. Considerable interruption has been caused to shipments, especially sheet bars, by the continuing strike at one important mill in the Pittsburgh district and by labor difficulties in other plants. Some of the 12 open hearths in a leading mill in the Pittsburgh district, which have been largely on sheet bar production are expected to be taken off this week.

Pipe

Delayed Financing and Approach of Cold Weather Further Hold Up Awards of Consequence

PIPE PRICES, PAGE 55

Pittsburgh—Seamless pipe still is the most severely depressed branch of the tubular products market, especially so from the oil field restrictions and failure of tonnage line pipe orders to develop. Bulk of orders in butt and lap-weld standard pipe is made up at the best of carload lots. A revision is being considered in the list on cold-drawn seamless tubing whereby prices per foot and per pound will be simplified. Indications are that the July 1 card of discounts on standard pipe likely will hold at least through the present quarter.

Cleveland—The market is quiet, with small orders from jobbers constituting the bulk of current business. A meeting of the Cleveland board of control was to decide late last week questions involving some of the general contracts for watermains, on which placing of additional material this week depends, involving 5000 tons of plates and nearly 6000 tons of cast pipe.

Chicago—Difficulties of some municipalities in providing acceptable collateral for federal loans are postponing placing of pipe orders. Few purchases are made and inquiries are slow. Larger cities generally are postponing new construction, while approach of cold weather is expected further to restrict activity. Chicago is inquiring for 100 tons of special castings for water pipe. Chicago delivered prices are 40 cents a ton lower as a result of elimination of freight surcharges.

Boston—Cast pipe demand continues light, but with several large lots only awaiting financing. A state job at Bridgewater, Mass., involving 200 tons, has been awarded. Merchant steel pipe is dull.

New York — Cast pipe inquiry is sluggish, limited largely to miscellaneous state projects, the largest being for a state hospital water line at Ithaca, N. Y. On standard pipe $35, eastern foundry, is frequently shaded. Following hearing on the cast pipe code Oct. 9, a steadying of the price structure is expected.

Birmingham, Ala.—Awards are slow and the market generally is lagging, production having been cut to less than 40 per cent of capacity. Some cast iron pressure pipe is being shipped on old contracts.

Cast Pipe Placed

200 tons, state project, Bridgewater, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

Unstated tonnage, steel tubing, bureau of supplies and accounts, navy department, east and west yards, to National Tube Co., Pittsburgh.

Cast Pipe Pending

317 tons, pipe and fittings, sewer and water line, Herman Biggs hospital, Ithaca, N. Y.; bids Oct. 17.

103 tons, special castings for 3 to 24-inch water pipe, Chicago; bids Oct. 11.

100 tons, 4, 6 and 8-inch, for Ocean Beach, N. Y.; bids Oct. 16.

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Structural Shapes Pending

(Concluded from Page 61)

W. Va.

2000 tons, Hall of Records, Oakland, Calif.; bids soon.

2000 tons, Mississippi river lock and dam, Fountain City, Wis.; Worden Allen Co., Milwaukee, low on steel; Merritt, Chapman, Whitney, Cleveland, low on general contract.

1500 tons, bridge, Henry, Ill., for Illinois state waterways division, Springfield.

1500 tons, bridge, Spring Valley, Ill., for Illinois state waterways division, Springfield.

1100 tons, sheet piling, dam No. 3, Allegheny river, Seeds & Durham, Philadelphia, low for general contract. Considerable used sheet piling also will be required.

875 tons, state bridges, Revere-East Boston, Mass.

800 tons, airplane hangar, Pensacola, Fla.

800 tons, four hangars, Corry field, Pensacola, Fla.; Murch Bros., St. Louis, low.

775 tons, twin locks including gates, power house and operating machinery, Kanawha river, near Winfield, W. Va.; Brader Construction Co., New York, low. Bids Oct. 2, United States engineer, Huntington, W. Va.

730 tons, bridges, St. Francis river, Lake City-Monette road, highway 18, Arkansas; bids Oct. 17, Little Rock, Ark.

570 tons, state highway bridge, Leavittsburg, O.; bids in Oct. 6.

525 tons, bridge, Mystic river, Medford, Mass.

530 tons, chemistry building, Howard university, Washington.

500 tons, bridge, Mobile, Ala.

360 tons, inspection bridge for San Francisco-Oakland bridge; bids soon.

350 tons, bridge, Miles City, Mont.

325 tons, state bridges, New Hampshire; Kittredge Bridge Co., Concord, N. H., low on Landaff bridge, $71,839.43; Davison Construction Co., Manchester, N. H., low on Warner bridge, $8778.70. Bids Sept. 28.

295 tons, garage, for Johns Hopkins hospital, Baltimore; McClintic-Marshall Corp., Bethlehem, Pa., reported low.

250 tons, approximately, bridges, York county, Pennsylvania; James B. Long, Norristown, Pa., engineer; bids to be asked shortly.

250 tons, state bridge in Eagle county, Colorado; bids Oct. 5.

203 tons, two Pennsylvania state bridges; bids Oct. 19.

200 tons, flood gates, Lake Okeechobee, Fla.; bids Oct. 9.

200 tons, power plant, navy yard, Brooklyn, N. Y.; bids in.

160 tons, state highway bridge, Thurman, N. Y.

140 tons, state highway bridge, Stark county, Ohio; bids in Oct. 6.

120 tons, bridge to carry route 10, section 4 across route 5, Morris Plains, N. J.; bids Oct. 23.

100 tons, garage, office and heating plant for the state highway department, Lockhaven, Pa.; Hood & Gross Inc., Philadelphia, low for general contract.

100 tons, subway for Southern Pacific Co., at McConnel, Calif.; bids soon.

Unstated tonnage, radio antenna towers in lots of 80 to 140 and similar towers in lots of 20 to 70, schedule 25603, division of purchases, department of commerce, Washington; bids Oct. 17.

Pig Iron

Shipments Against Old Orders Continue Fair—New Business Is Light, Mostly Spot Needs

PIG IRON PRICES, PAGE 56

Pittsburgh — Merchant iron market still features a lack of forward buying although shipments are fair. One open-hearth plant of a nonintegrated producer has increased its releases on basic iron recently from outside sources with the addition of two more open hearths. Louisville, Ky., engineers are asking bids Oct. 20 on castings and metal parts for reconstructing locks and dams Nos. 45, 46, 49 and 50 in the lower Ohio river. Pig iron prices are stable at $18 for foundry grades, $17.50 on basic and $18.50 on bessemer.

Cleveland—Shipments in September exceeded those of any month this year, but present outlook is less favorable. Strikes are introducing an element of uncertainty. Consumption by the automotive industry will be in smaller volume, according to present indications. Foundry codes have not been given final approval. Prospects for higher fuel costs lead makers to anticipate an early advance over the present base of $17.50, lake furnaces. A merchant furnace interest here booked 3000 tons during the week.

Chicago — New business is light, principally small fill-in lots. Shipments are steady, however, and most important consumers are well protected against fourth quarter requirements. Although there is no urgency, consumers are interested in taking in this iron since contract prices generally are lower than the prevailing $17.50, furnace, for No. 2 foundry and malleable. Sufficient unshipped iron remains on books to assure a steady movement the rest of the year.

Boston — Consumers have been taking fair shipments against contracts, but new buying is light, as is inquiry, except one for 500 tons or more of No. 2X for a northern New England interest. Adoption of a 50-cent rate on delivery, Everett to Boston, makes the delivered price to the latter point $18.50 for foundry iron, affecting also delivered price of Buffalo and southern iron, the latter still having a 38-cent advantage allowed under a code resolution.

Buffalo—Demand has slowed considerably, consumers being comfortably supplied for the present. Prospects of higher prices may cause additional coverage shortly. So far, labor disorders in the Buffalo district have had little effect on melt.

Philadelphia — While new business still is restricted chiefly to carlots, orders are more numerous. Meanwhile, prices are steady with basic at $17.76, delivered, Philadelphia; No. 2 foundry at $18.26; malleable at $18.76; and bessemer at $19.26. Weakening influence of an easier scrap market is being offset by the continued upward trend in coke and fuel prices. Approximately 6600 tons of foreign iron, principally Royal Dutch, arrived here recently.

Cincinnati — Shipments have dropped sharply the past week, most contracts having been exhausted during the third quarter. Principal consumers have stocks of lower-

HERE'S A P & H-HANSEN QUALITY WELD
See how uniform it is. Penetration is good and uniform. There is no wasteful overlapping of the bead. Proper current and arc control makes such welds easy with the P&H-Hansen Arc Welder.

NOTE: Both welds were made with heavily coated electrode.

THIS WELD IS FAULTY
Note how the bead has piled up. Time and material are wasted without adding to strength. Too short an arc was used, probably because the arc was sluggish and varying.

STUDY *your* WELDS

Here's How You Can Have Quality Welding

Any man who has learned his A, B, C's in welding will tell you that current control is all-important in quality welding. To be sure, you need a good operator, but fortunately there are plenty available who know their stuff.

P&H-Hansen has been designed for positive, simple current control. You'll find, for instance, that P&H-Hansen far exceeds all standard specifications in assuring uniformity of current flow. This means greater smoothness of weld, more uniform penetration, higher speed and sounder, stronger welds.

In simplicity of design, ease of control, low operating cost, the P&H-Hansen welder is unique. You'll be interested in the descriptive matter contained in our new bulletin *"Weld It Well."* Send for your copy today.

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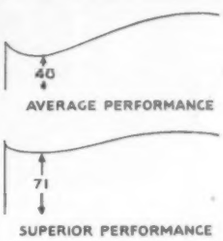

Voltage Recovery

Here's graphic evidence of the rapid voltage recovery of the P&H-Hansen. When circuit is opened from short circuit the voltage on a P&H-Hansen falls to but 71 volts and rapidly recovers to normal, while the voltage of the ordinary type of welder falls to approximately 40 volts and gradually increases to normal.

P&H-HANSEN ARC WELDER
AMERICA'S FINEST FASTEST WELDER

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ELECTRODES

If you weld stainless alloys buy from the oldest company producing Alloy Electrodes exclusively and serving the world's leading steel producers and users.

All popular analyses of chrome and chrome-nickel electrodes carried in stock.

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7311 Union Ave., Cleveland, Ohio

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For more than sixty years PHOENIX ROLLS have been the standard of comparison and service throughout the steel mills of the world, rolling millions of tons of steel annually.

PHOENIX SERVICE: has come to mean a continuing interest in every roll we sell until its full life has been obtained.

Recently modernized Open Hearths, Air Furnaces, Grinding and Finishing equipment enable us to lead the present day trend toward more durable rolls which will give better finish and reduced rolling mill costs.

Our latest development, PHOENIXLOY, a uniformly hard roll, is giving service today in many flat rolling mills which only two years ago was thought impossible.

Phoenix Metal Rolls
Phoenix "A" Rolls
Phoenix "K" Rolls
Phoenix Tube Mill Rolls
Phoenix Chill Rolls
Phoenix Nickel Chill Rolls
Phoenix Steel Rolls
Phoenix Sand Rolls

PHOENIXLOY
(Uniformly Hard)

NRA

PITTSBURGH ROLLS CORPORATION

» » » » **PITTSBURGH, PA.** « « « «

priced iron adequate for early needs, and buying is dull. Northern iron continues $17.50, base, Hamilton, and southern iron 38 cents less.

New York—Sales are the largest in several weeks, several thousand tons reported placed. Prices are un-

St. Louis—In spite of the lack of new buying the melt holds up well, a number of foundries having stepped up operations. September shipments exceeded the August total by a small margin. The 38-cent differential in St. Louis delivered price between northern and southern iron has been restored, and an arbitrary switching charge average of 50 cents per ton has been adopted in pricing to local melters.

Birmingham, Ala. — Sales are of the spot class entirely. Base price is fixed for the last quarter and consumers are confident they can get iron as needed, should an emergency arise. Melters carry small stocks.

Toronto, Ont. — With minor improvement taking place in the Canadian iron and steel industry, merchant iron sales are increasing. While most orders are in single-car lots, some booking has been done for lots up to 300 tons from the larger users. No contract placing for last quarter delivery is reported.

Coke

Beehive Price To Advance; By-Product Demand Steady

Coke Prices, Page 56

Coke and coal markets were both unsettled last week in the western Pennsylvania district. Nominal markets on beehive furnace and foundry grades find no sales to test. Soft coal prices have been filed under the coal code but the extent of the impending advance in beehive coke is not determinable.

Iron Ore Shipments Up

Iron Ore Prices, Page 56

Cleveland—A few additional cargoes of iron have been specified for delivery this year on long term contracts, rounding out furnace requirements. These, with continuation of heavy shipments, indicate the movement for the season will reach 25,000,000 tons, compared with 3,500,000 tons last year. Final figures show 5,504,175 tons was shipped in September, 4,862,947 tons more than in the month last year. The total to Oct. 1 this year is 16,301,573 tons, an increase of 13,910,418 tons over the comparable period last year.

Scrap

Melters Evince No Interest—Prices Resist Well but Give Way Slightly in Spots

Pittsburgh — The market still exhibits a weak tone because of decided lack of forward interest on the part of mills. At Youngstown sale of some 5000 tons of No. 1 heavy melting steel and hydraulic compressed bundles at $12.50 and blast furnace scrap at $8.75 may cast some light upon an untested Pittsburgh market. Railroad lists provided the only subject of comment in the market last week, with the 5000 tons of melting steel on the 25,000-ton Pennsylvania railroad list. Lists to be closed this week are the 7800-ton Baltimore & Ohio, Oct. 9, and the 4600-ton Norfolk & Western, Oct. 13. In the former are 4000 tons of rails and 1050 tons of iron wheels, and in the latter 1800 tons of rails. Dealers have dropped asking prices on heavy breakable and cupola cast by

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.50 to 10.00
Boston, dealers	6.25 to 6.75
Buffalo, No. 1	10.50 to 11.00
Buffalo, No. 2	9.00 to 10.00
Chicago	9.50 to 10.00
Cleve., No. 1	10.25 to 10.75
Cleve., No. 2	9.75 to 10.25
Det., No. 1	8.00 to 8.50
Det., No. 2	7.00 to 7.50
E. Pa.	10.50
E. Pa., No. 2	8.50 to 9.00
Federal, Ill.	8.75 to 9.25
Granite City, Ill.	8.25 to 8.75
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	7.00
Pitts., No. 1	12.50 to 13.00
St. L. No. 1 del.	9.75 to 10.25
Valleys, No. 1	12.50 to 13.00

COMPRESSED SHEETS

Buffalo, dealers	9.00 to 10.00
Chi. (Factory)	7.75 to 8.75
Cleveland	9.50 to 10.00
Detroit	8.00 to 8.50
E. Pa. new mat.	10.00 to 10.50
Pittsburgh	12.00 to 12.50
Valleys	12.00 to 12.50

BUNDLED SHEETS

Buffalo	5.50 to 6.00
Cincinnati, del.	6.00 to 6.50
Cleveland	8.00 to 8.50
Eastern Pa.	9.00 to 9.50
Pittsburgh	11.00 to 11.50
St. Louis	6.00 to 6.50

SHEET CLIPPINGS LOOSE

Chicago	4.50 to 5.00
Cincinnati	4.50 to 5.00
Detroit	5.00 to 6.00
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	11.50 to 12.00
Boston, dealers	7.00 to 7.25
Buffalo	12.00 to 12.50
Chicago (3 ft.)	11.00 to 11.50
Chicago (2 ft.)	12.00 to 12.50
Cincinnati, del.	11.50 to 12.00
Detroit	10.00 to 10.50
Pitts. (open-hearth, 3 ft. and less)	14.50 to 15.00
St. Louis	11.50 to 12.00

STOVE PLATE

Birmingham	7.00 to 7.50
Boston, dealers	4.50 to 4.75
Buffalo	9.00 to 9.50
Chicago, net	7.00 to 7.50
Cinci., deal.	7.00 to 7.50
Detroit, net	4.50 to 5.00
Eastern Pa.	8.00 to 8.50
N. Y. deal, Fdry.	6.00
St. Louis	7.00 to 7.50

COUPLERS, SPRINGS

Buffalo	11.50 to 12.00
Chicago	10.50 to 11.00
Eastern Pa.	13.50 to 14.00
Pittsburgh	14.50 to 15.00
St. Louis	10.00 to 10.50

ANGLE BARS—STEEL

Chicago	10.50 to 11.00
St. Louis	10.00 to 10.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	11.50 to 12.50
Cleveland bil. and bloom crops	12.50 to 13.50
Eastern Pa. crops	14.00 to 14.50
Pittsburgh billet bloom crops	14.50 to 15.00
Pitts., sheet bar crops	14.50 to 15.00

FROGS, SWITCHES

Chicago	9.50 to 10.00
St. Louis	10.00 to 10.50

SHOVELING STEEL

Chicago	9.50 to 10.00
Cleveland	10.50 to 11.00
St. Louis	9.00 to 9.50

RAILROAD WROUGHT

Birmingham	8.00 to 8.25
Boston, dealers	2.00 to 2.50
Buffalo, No. 1	7.00 to 8.00
Buffalo, No. 2	10.50 to 11.00
Chi., No. 1, net	8.00 to 8.50
Chi., No. 2	9.50 to 10.00
Cinci., No. 2	9.00 to 9.50
Eastern Pa.	10.50 to 11.00
N. Y., No. 1 deal.	7.00 to 7.50
Pitts., No. 1	12.50 to 13.00
St. Louis, No. 1	7.00 to 7.50
St. Louis, No. 2	8.75 to 9.25

SPECIFICATION PIPE

Boston	4.00 to 4.50
Eastern Pa.	9.50 to 10.00
N. Y., deal.	4.75 to 5.25

BUSHELING

Buffalo, No. 1	9.00 to 10.00
Chicago, No. 1	7.75 to 8.25
Cinci., No. 1 deal.	6.50 to 7.00
Cinci., No. 2	3.00 to 3.50
Cleve., No. 2	7.00 to 7.25
Det., No. 1 new	7.00 to 7.50
St. Louis, No. 1	6.50 to 7.00
Val. new No. 1	12.50 to 13.00

MACHINE TURNINGS

Birmingham	4.00 to 5.00
Boston, dealers	2.75 to 3.00
Buffalo	6.25 to 7.00
Chicago	5.50 to 6.00
Cinci., deal	5.00 to 5.50
Cleveland	7.00 to 7.50
Detroit	5.50 to 6.00
Eastern Pa.	6.50 to 7.00
N. Y., deal.	4.00 to 4.50
Pittsburgh	9.50 to 10.00
St. Louis	4.50 to 5.00
Valleys	10.75 to 11.00

BORINGS AND TURNINGS
For Blast Furnace Use

Boston, dealers	2.50 to 2.75
Buffalo	6.25 to 7.00
Cinci., deal.	5.00 to 5.50
Cleveland	7.50 to 7.75
Detroit	6.25 to 6.75
Eastern Pa.	6.00 to 6.50
N. Y., deal.	3.00
Pittsburgh	8.50 to 9.00

CAST IRON BORINGS

Birming., plain	3.50 to 4.50
Boston, chem.	10.00 to 11.00
Boston, dealers	3.25 to 3.50
Buffalo	6.25 to 7.00
Chicago	5.50 to 6.00
Cinci., deal.	5.00to 5.50
Cleveland	7.50 to 7.75
Detroit	6.25 to 6.75
E. Pa., chem.	12.00 to 15.00
N. Y., deal.	3.00
Pittsburgh	8.50 to 9.00
St. Louis	4.75 to 5.25

PIPE AND FLUES

Cinci., deal.	4.50 to 5.00

RAILROAD GRATE BARS

Buffalo	5.00 to 5.50
Chicago, net	7.00 to 7.50
Cincinnati	5.00 to 5.50
Eastern Pa.	8.00 to 8.50
N. Y., deal.	5.25 to 5.50
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, dealers	5.00 to 5.50
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	9.00 to 9.50
Detroit	7.50 to 8.00

FORGE SCRAP

Boston, dealers	4.00 to 4.50
Chicago (heavy)	11.00 to 11.50
Eastern Pa.	10.00

ARCH BARS, TRANSOMS

Chicago, net	8.00 to 8.50
St. Louis	9.50 to 10.00

AXLE TURNINGS

Boston, dealers	4.50 to 4.75
Buffalo	7.50 to 8.00
Chi., elec. fce.	8.00 to 8.50
Cleveland	9.50 to 10.00
Eastern Pa.	9.50 to 10.00
St. Louis	5.50 to 6.00

STEEL CAR AXLES

Birmingham	11.00 to 11.50
Boston, ship. pt.	8.00 to 8.50
Buffalo	10.00 to 11.00
Chicago, net	10.00 to 10.50
Eastern Pa.	15.50
St. Louis	11.50 to 12.00

SHAFTING

Boston, ship. pt.	9.25 to 9.50
Eastern Pa.	15.00 to 15.50
N. Y., deal.	10.00 to 10.25
St. Louis	8.00 to 8.50

CAR WHEELS

Birming., iron	9.00 to 9.50
Boston, iron deal.	6.75 to 7.25
Buffalo, iron	8.00 to 9.00
Buffalo, steel	11.00 to 11.50
Chicago, iron	9.50 to 10.00
Chi., rolled steel	10.50 to 11.00
Cincinnati, iron	8.50 to 9.00
E. Pa., iron	12.00 to 13.00
E. Pa., steel	13.50 to 14.00
Pitts., iron	11.50 to 12.00
Pitts., steel	14.00 to 14.50
St. Louis, iron	8.50 to 9.00
St. Louis, steel	10.00 to 10.50

NO. 1 CAST SCRAP

Birmingham	9.00 to 9.50
Boston, No. 2	5.00 to 5.50
Boston, Tex. con.	10.75 to 11.00
Buffalo, cupola	10.00 to 10.50
Buffalo (mach.)	10.00 to 11.50
Chicago, agri. net	8.00 to 8.50
Chi., mach. net	9.50 to 10.00
Chi., railroad net	9.00 to 9.50
Cinci., mach. cup.	8.25 to 8.75
Cleve. cupola	10.50 to 11.00
Detroit, net	8.00 to 8.50
E. Pa., cupola	12.00
N. Y., cup. deal.	6.00 to 6.50
N. Y., del. local foundries	9.00 to 9.50
Pitts., cupola	11.00 to 11.50
San Fran., del.	13.50 to 14.00
Seattle	4.50 to 6.50
St. Louis, No. 1	9.00 to 9.50
St. L. No. 1 mach.	9.00 to 9.50

HEAVY CAST

Boston, del.	5.75 to 6.00
Buffalo, break	7.00 to 8.00
Cleve., break	7.50 to 8.00
Detroit break	5.50 to 6.00
Detroit, auto net	8.50 to 9.00
Eastern Pa.	10.00 to 10.50
N. Y., No. 1, deal.	7.00 to 7.50
N. Y., break. deal.	6.25 to 6.75
Pittsburgh	10.50 to 11.00

MALLEABLE

Boston, consum.	12.50 to 13.00
Buffalo	11.00 to 12.00
Chicago, R. R.	10.00 to 10.50
Cinci., agri. del.	8.25 to 8.75
Cinci., R. R. del.	8.75 to 9.25
Cleveland, rail	11.50 to 12.00
Detroit, auto	7.50 to 8.00
St. Louis, R. R.	9.50 to 10.00
Eastern Pa., R. R.	12.50 to 13.00

RAILS FOR ROLLING
5 feet and over

Birmingham	10.00 to 10.50
Boston, dealers	7.00 to 7.25
Buffalo	9.00 to 9.50
Chicago	11.00 to 11.50
Eastern Pa.	12.50
New York, dealer	8.00 to 8.25
St. Louis	10.50 to 11.00

LOCOMOTIVE TIRES

Chicago, cut	10.50 to 11.00
St. L., No. 1	8.50 to 9.00

LOW PHOS. PUNCHINGS

Buffalo	11.00 to 11.50
Chicago	11.00 to 11.50
Eastern Pa.	12.50 to 13.50
Pittsburgh	14.50 to 15.00

50 cents a ton. A minor sale of re-rollers has been made nearby at $15.

Cleveland—Weakness in sympathy with other centers has caused quotations on open-hearth grades of scrap to decline 25 to 50 cents. Prices in the Valleys are also lower. Buying is practically absent, though some blast furnace material is moving.

Chicago—While mill buying of steel scrap continues light, available supplies are decreasing and a stronger tone is noted. Some dealers now are unwilling to accept orders at prices prevailing on recent purchases. Shipments to some points are slow. New business is as quiet as formerly. While last sales of heavy melting steel were made at $9.75, few offerings now are made at this figure.

Boston — Demand for scrap is dull, all grades moving slowly with price easiness covering a wider range, including chemical borings. Steelmaking grades are listless with the largest consumer unwilling to pay better than $8 delivered, Worcester, and not inclined to take much at that price. As a result dealers are offering from $6.25 to $6.75 for heavy melting steel.

New York—Demand for all grades of scrap continues sluggish, but with prices fairly steady. Heavy breakable cast is moro active than other grades. Most eastern steel works still hold up shipments and buying of melting steel in this territory is mostly against export orders, $8, barge, being paid for No. 1 and $7 for No. 2.

Philadelphia — Further softness prevails in scrap prices, trading being sluggish. No. 1 heavy melting steel is weak at $10.50, delivered, while No. 2 is off to a spread of $8.50 to $9. Recent opening of several hundred tons of scrap at the local navy yard elicited little interest from buyers. In fact, there was no more than one bidder for most of the tonnage.

Buffalo—Demand for scrap is slow, with no sales to confirm nominally lower prices except in the case of No. 2 heavy melting steel, for which $9 contracts have been made and deliveries begun. Melt of scrap has dropped sharply.

Detroit—In the absence of any mill demand, iron and steel scrap quotations are unchanged. There is a possibility that further reductions are near, but this week there is no definite change from last week.

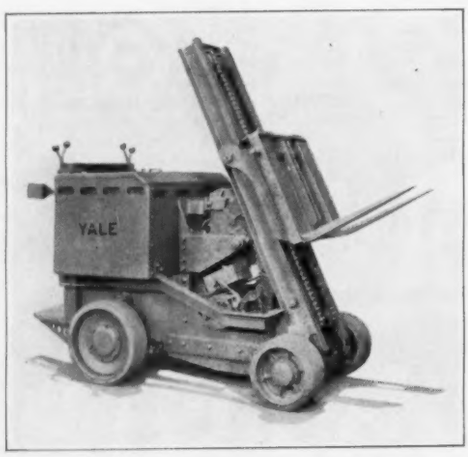
Cincinnati—Iron and steel scrap continues dull with mills not buying and activity confined chiefly to dealers covering contracts. Prices are unchanged but scrap is in better supply without much distress material.

St. Louis—The iron and steel scrap situation has not changed, buying is at a minimum and deliveries show signs of tapering as orders are filled.

Birmingham, Ala.—Iron and steel scrap continues quiet and prices are steady. Melters of heavy melting steel seem to have sufficient stock for present needs.

Toronto, Ont.—Iron and steel scrap sales are holding well up to the average for the year. While demand is specialized, active grades are moving more freely than earlier in the year. Steel grades have been fairly active on export account, but little buying has been done by Canadian mills.

TRADE YALE MARK



WHEN MINUTES COUNT

IN these days of industrial modernization all executives realize the importance of minutes saved. Time lost is *money* lost—and it cannot be recovered.

Too frequently, modernization while stressing these factors that make for finer quality, greater production and better plant arrangement, overlooks that vitally important element in efficiency — materials handling. Machines remain idle because raw materials are held up by inadequate lifting and hauling equipment.

Yale Hand or Electric Hoists, combined with Yale Trolleys—or Yale Hand Lift and Electric Trucks with Yale Steel-Bound Skid Platforms—will facilitate interplant handling operations and save time in getting materials into position for machines to fabricate and likewise simplify the storing of raw or finished products.

Yale Engineers have made studies in hundreds of diversified industries and many manufacturers have profited by their experience.

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THE YALE & TOWNE MFG. CO.

PHILADELPHIA DIVISION, PHILADELPHIA, PA., U.S.A.

NRA WE DO OUR PART

Makers of Yale Electric Trucks, Hand Lift Trucks, Hand Chain Hoists, Electric Hoists and Trolleys.

Bolt, Nut Price Delayed

Bolt, Nut, Rivet Prices, Page 55

Discount of 73 off on bolts and nuts applies only to Oct. 31 on shipments completed by Nov. 15. Delay results from the bolt and nut code

not being approved. Rivets are quoted at 2.50c, Pittsburgh, until Nov. 1. Railroad requirements for repair work lead present demand, automotive buying being less. Sales are somewhat smaller. And change in discounts seems likely to be lower because of rising costs.

Port of New York Authority will open bids Nov. 6 on 2000 tons of bolts and nuts for the midtown tunnel.

Ferroalloys Steady

Ferroalloy Prices, Page 56

Contracting of ferromanganese for fourth quarter has been practically concluded by most consumers, at the unchanged price of $82, eastern seaboard. Specifications show little improvement over a week ago. Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $27, furnace, for spot shipment.

Railroads

Needs Near Million Tons; Price Below $35 Is Asked

Track Material Prices, Page 55

Purchase of 844,525 tons of rails and 245,221 tons of fastenings, perhaps even larger tonnages, is forecast in a statement by Joseph B. Eastman, federal co-ordinator of transportation, to the four rail producers in the United States, United States Steel Corp., Bethlehem Steel Corp., Inland Steel Co. and Colorado Fuel & Iron Co. This is a total of 1,089,746 tons of steel products.

These purchases are largely contingent on a reduction in the base price of rails below the prevailing $40 per ton. Some roads have made it a condition that the price shall not exceed $35 per ton. The co-ordinator states in his letter that available information warrants a conclusion that the price should be below rather than above $35 per ton. In case this conclusion is challenged he suggests examination of books and records of the steel companies to clear it up.

Prices on fastenings are not asked at present as these are made by many more companies than produce rails. Railroads will be urged to conform as far as possible to standard specifications for rails, to simplify purchases.

It is suggested that under the code of fair competition the lowest price submitted by any railmaker will be accepted and become the prevailing price for all companies. Allocation will be made after consultation with railroads as to preferred delivery points, to obtain lowest delivered prices. These being equal, preference will be to the lowest bidder.

The Pennsylvania desires to place

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Produced by

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Since 1896 the Crosby plant has been devoted, exclusively, to designing and producing Sheet Metal Stampings. Avail yourself of this experience. Send us your next stamping problem and watch results.

THE CROSBY COMPANY

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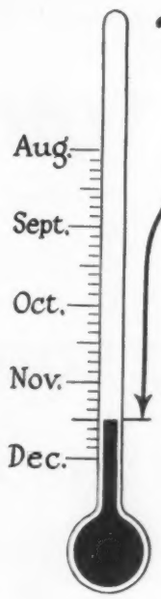


You take a chance after November 15th. Get your *WINTER SAND SUPPLY IN EARLY* and save yourself the cost and trouble of unloading frozen material.

MOLDING — CORE — FURNACE BOTTOM — HEATING BOTTOM — SAND BLAST.

DICK — PORTAGE — "BEDFORD"
COXEY — VENANGO — OLIVER — GEAUGA

INDUSTRIAL SILICA CORP.

YOUNGSTOWN, OHIO

its own orders for its requirements of 100,000 tons and does not stipulate a price reduction. In the case of 452,785 tons, and perhaps of 502,785 tons, orders are contingent on loans from PWA on a ten-year note at 4 per cent.

Early delivery will be asked in most cases but the Southern Pacific will want part in 1934, the Lackawanna 2000 tons in 1933 and 10,000 tons in 1934, the Western Maryland 2000 tons in 1933 and 2000 tons in 1934 and the Northern Pacific 5000 tons each in 1933 and 1934.

The detail of rail and fastening tonnages asked by each railroad is as follows:

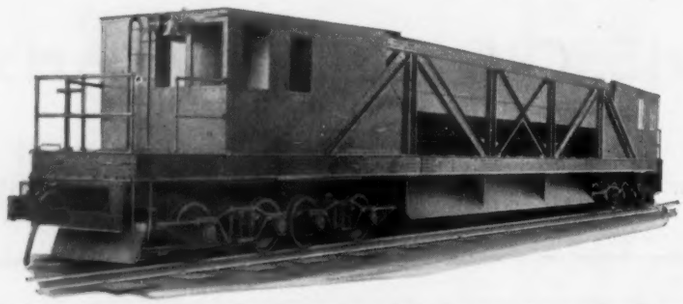
Name of Railroad	Rails, tons	Fastenings, tons
Atchison, Topeka & Santa Fe	50,000	15,000
Atlantic Coast Line	10,000	3,000
Baltimore & Ohio, C. of N. J., Reading, Alton	50,000	15,000
Boston & Maine, Maine Central	40,000	12,000
Bangor & Aroostook	3,500	1,050
Clinchfield	3,000	900
Chicago & North Western	65,000	14,364
Chicago Great Western	12,000	3,600
Central Vermont	5,000	1,500
Chicago & Western Indiana, Belt Ry. of Chicago	3,000	900
Cotton Belt	9,000	2,700
Chicago, Burlington & Quincy	25,000	3,000
Chicago & Illinois Midland	1,750	525
Chicago, Rock Island & Pacific	20,000	6,000
Delaware & Hudson	5,000	1,500
Delaware, Lackawanna & Western	12,000	3,600
Denver & Rio Grande Western	10,000	3,000
Erie	30,000	9,000
Gulf, Mobile & Northern	5,000	1,500
Illinois Central	20,000	6,000
Louisiana & Arkansas	12,000	3,600
Lehigh & New England	3,285	985
Louisville & Nashville	25,000	7,500
Missouri-Kansas-Texas	4,500	1,350
Monon	3,000	900
Mobile & Ohio	3,000	900
Missouri Pacific, GCL, IGN	25,000	7,500
Milwaukee	50,000	15,000
New York, New Haven & Hartford	20,000	7,500
Nashville, Chattanooga & St. Louis	3,490	1,047
Northern Pacific	10,000	3,000
Norfolk & Western	10,000	3,000
Pennsylvania	100,000	30,000
Richmond, Fredericksburg & Potomac	500	150
St. Louis-San Francisco	26,000	7,800
Seaboard Air Line	17,000	5,100
Southern	50,000	15,000
Soo Line, Wisconsin Central	7,500	2,250
Southern Pacific	25,000	7,500
Tennessee Central	2,500	750
Toledo, Peoria & Western	5,000	1,500
Texas & Pacific	500	150
Union Pacific	25,000	7,500
Western Maryland	4,000	1,200
Western Pacific	20,000	6,000
Wabash	10,000	3,000
Central of Georgia	3,000	900
Total	844,525	245,221
Grand total		1,089,746

Lima Locomotive Works, Lima, O., has received releases on 25 electric locomotives for the Pennsylvania, bought several months ago. Delivery is to be Dec. 1.

Cars placed in September totaled 23, the lowest number since May. Cumulative purchases for nine months are below a year ago. Details follow:

	1933	1932	1931	1930
Jan.	3	159	100	5,072
Feb.	0	35	50	17,027
March	5	105	2,166	6,118
April	50	0	2,798	1,997
May	8	60	20	1,392
June	500	0	1,910	998
July	306	25	617	1,389
Aug.	202	5	1,304	1,111
Sept.	23	1,298	703	576
9 Mo.	1,097	1,687	9,668	35,680
Oct.		0	980	4,116
Nov.		2	35	2,621
Dec.		50	11	2,729
Total		1,739	10,694	45,146

ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

OTHER ATLAS PRODUCTS

Gas-Electric and Diesel-Electric Locomotives . . . Electric Transfer Cars for Blast Furnaces and Steel Plants . . . Stockhouse Scale Cars for Blast Furnaces . . . Concentrate and Calcine Cars for Copper Refineries . . . Automatic and Remote Controlled Electric Cars . . . Pushers, Levellers and Door Extractors . . . Coal Charging Lorries, Coke Guides and Clay Carriers . . . Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . . Atlas Patented Indicating and Recording Scales . . . Special Cars and Electrically Operated Cars for every conceivable Purpose

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Car Orders Placed

Armour & Co., Chicago, 500 refrigerator car underframes, 2500 to 3000 tons of steel, to Pullman Car & Mfg. Corp., Chicago.

Chicago Surface Lines, one streamlined street car each to Pullman Car & Mfg. Corp., Chicago, and J. G. Brill Co., Philadelphia.

Car Orders Pending

Navy, miscellaneous cars as noted in STEEL, Oct. 2, Hoffner-Thrall Car Co., Chicago, low, except on four cars for Pearl Harbor, T. H., on which American Car & Foundry Co., New York, is low; bids Oct. 3.

Rail Orders Pending

Norfolk & Western, 10,000 tons, with fastenings additional. This in addition to 10,000 tons bought earlier this year.

Equipment

Awards Motors, Control Units For New Gary Strip Mill

Pittsburgh—A continuation of the Western Pennsylvania coal strike and the beginnings of labor difficulties in the Pittsburgh district steel mills, have forced consideration of steel mill equipment buying to the background. Roll buying has declined so far this month, as against early September. However, shipments of ingot molds are showing some life.

Chicago—American Sheet & Tin Plate Co. has awarded Westinghouse Electric & Mfg. Co. motor and control equipment for its new cold rolling mill at Gary, Ind. The order includes a 1500-horsepower main mill motor, two 700-horsepower reel motors, auxiliary motors and complete motor control apparatus. Youngstown Sheet & Tube Co. is starting extensions to storage and shipping facilities of bar and billet mills at Indiana Harbor, Ind., and plans installation of additional equipment to double its capacity for rolling railroad tieplates.

New York—Machinery demand is heavier with several automobile builders interested, at least three placing some business, Chevrolet, Chrysler and Pontiac. The Navy department is inquiring for seven engine lathes, a group of precision lathes, five horizontal boring, milling and drilling machines and eight boring mills, closing Oct. 17.

Boston—Inquiry and orders for machinery are heavier, improvement being especially noted in grinding equipment shops. A Worcester district grinding machinery builder has sold eight machines to Russia and with a gain in scattering orders, materially increased volume last month. Another grinding machine interest had the best month in several years.

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Philadelphia, Pa.

1017 Fisher Bldg.
Detroit, Mich.

Steel Sales Corp.
129 South Jefferson St.
Chicago, Ill.

H. L. Brown,
2091 Carew Tower
Cincinnati, Ohio

Died:

(*Concluded from Page 21*)

known construction engineer of Erie, Pa., and Pittsburgh, at Erie, Pa., Sept. 30. He had been connected with the T. A. Gillespie Co. more than 25 years during which time he supervised construction of various pipe lines, bridges and several waterworks.

□ □ □

Charles E. Newell, 71, partner in the Cleveland Pump & Supply Co., in Lakewood, O., Oct. 1.

□ □ □

E. C. Hunt, 62, secretary and treasurer, Moline Tool Co., Moline, Ill., in that city, Sept. 21.

□ □ □

James S. Harrington, 81, president, Newark Brass Works, Newark, N. J., in Briolle, N. J., Sept. 29.

□ □ □

Adolf J. Becker, 63, formerly president of the Becker Steel Co., Charleston, W. Va., in New York, Sept. 22.

□ □ □

Herbert Thompson, 53, general traffic manager, Union Carbide & Carbon Corp., New York, in that city, Sept. 30.

□ □ □

Jacob M. Spitzglass, 64, vice president, Republic Flow Meters Co., and an inventor of electrical devices, in Chicago, Oct. 1.

□ □ □

Milton E. Coombs, 74, former superintendent of the Carnegie Steel Co.'s bar mills in the Youngstown, O., district, in Youngstown, Oct. 3.

□ □ □

George T. Thomas, 64, long associated as a salesman with the Youngstown Sheet & Tube Co., Youngstown, O., in that city, Oct. 2.

□ □ □

J. C. Wasson, 66, retired purchasing agent of the Pennsylvania Lubricating Co., Pittsburgh, in an automobile accident near Asheville, N. C., recently.

□ □ □

Mrs. Uretta Place Campbell, 79, widow of James A. Campbell, chairman emeritus of the Youngstown Sheet & Tube Co., Youngstown, O., who died Sept. 20. Mrs. Campbell survived her husband 13 days. She was of the same age as her husband, and died, as he did, of a heart attack.

□ □ □

Byron H. Rosenheimer, 49, industrialist and banker of Kewaskum, Wis., Sept. 30. He was one of the founders and sales manager of the Kewaskum Aluminum Co., vice president of the Bank of Kewaskum, and an officer and director in other enterprises.

□ □ □

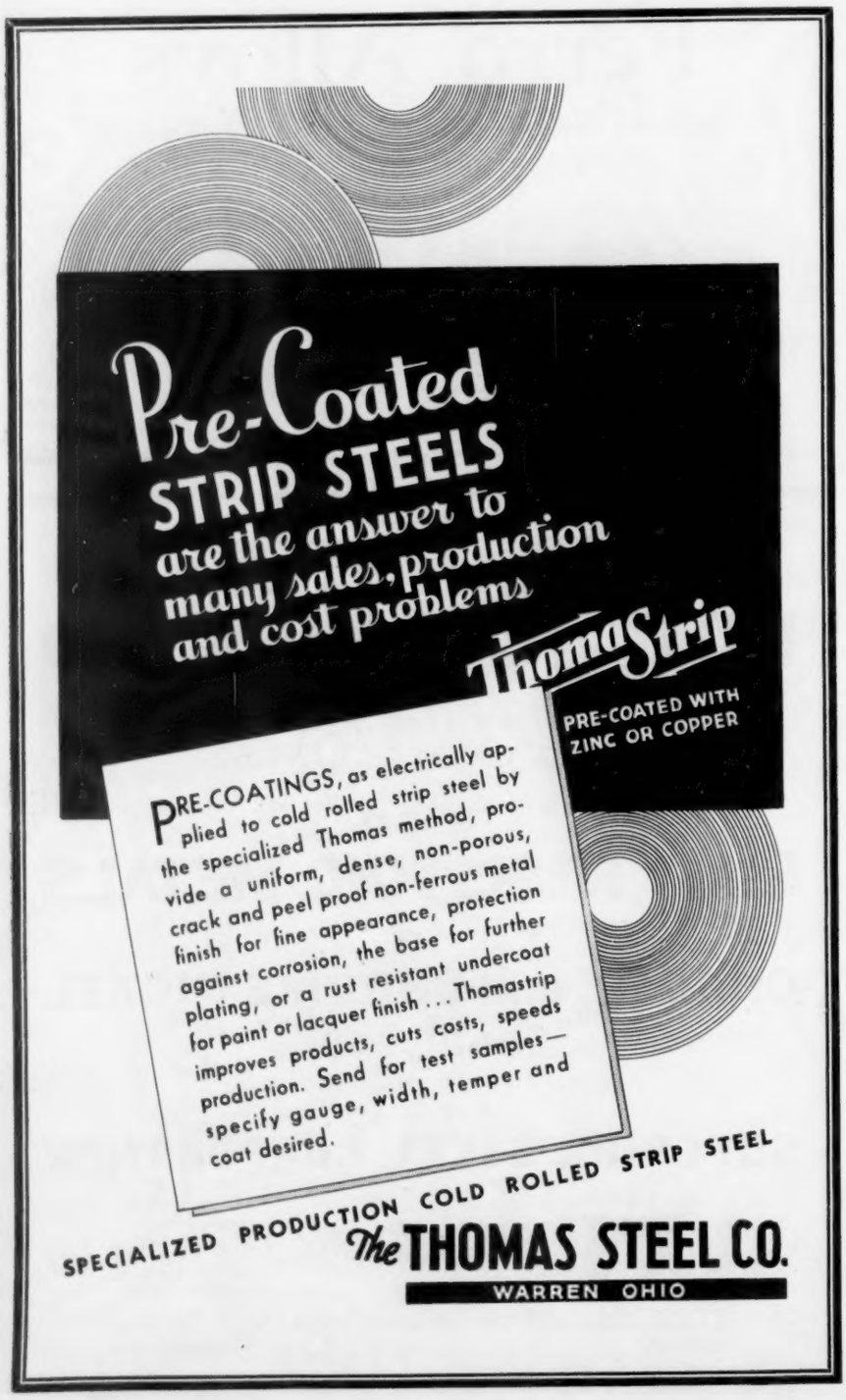
Horace P. Yale, 83, pioneer Milwaukee manufacturer of special machinery and dealer in machine tools, Sept. 30. In 1870 he became a partner in Arnold, Yale & Co. A few years later the name was changed to H. P. Yale & Co. Mr. Yale retired in 1915.

□ □ □

J. George Shaw, 67, founder and president of the former Milwaukee Steel Casting Co., Milwaukee, Sept. 26. He was born in England, learned the molder's trade there, and came to America in 1887. After long connection with the E. P. Allis Co., later the Allis-Chalmers Mfg. Co., he established his own foundry in 1905, retiring in 1917.

□ □ □

Frank D. Carney, retired metallurgical engineer, Oct. 3, at Andover, Mass. A graduate of the Massachusetts Institute of Technology in 1887, Mr. Carney entered the employ of the Pennsylvania Steel Co., later becoming superintendent and metallurgical engineer. For five years, starting in 1897, he was in Germany as consulting metallurgical engineer with Ludwig Lomore & Co. From 1902 to 1915 he was with the Pennsylvania Steel Co., joining the Bethlehem Steel Co. the latter year as metallurgist. Resigning in 1918, he opened offices in New York as a consultant. He was a member of the national societies devoted to engineering and the steel industry.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Pacific Coast

Boulder Dam Takes 4000 Tons Reinforcing Bars — 1933 Sales Above Those of 1932 Period—Public Works Near Letting Promise Heavy Buying—Jobber Turnover Active

San Francisco—(*By Air Mail*)—Price advances of $2 a ton on plates and shapes and $3 a ton on merchant bars went into effect Sept. 30. The present base price is 2.25c, f.o.b. cars, dock, Pacific Ports, on plates and shapes and 2.30c on bars. The reinforcing bar market was the most active, awards the largest in over nine weeks.

The largest concrete bar letting involved 4000 tons for Boulder dam. Colorado Fuel & Iron Co. took 2800 tons and Pacific Coast Steel Corp. 1200 tons. Unnamed interests were awarded 675 tons for highway work in 20 counties in California for the state, the largest project involving 192 tons for Los Angeles county. Over 2000 tons are now up for figures or pending. To date this year 58,541 tons have been placed, compared with 41,035 for the first three quarters in 1932.

Plate bookings exceeded 1500 tons. Mare Island and Puget Sound navy yards placed over 500 tons with various eastern mills. Western Pipe & Steel Co. secured 175 tons for three gates for the Pine Canyon dam, Pasadena, Calif. Bookings for the first three quarters of this year aggregate 52,258 tons, compared with 71,662 tons for the corresponding period in 1932.

Several fair sized structural lettings were noted and brought the total for the first nine months to 209,875 tons, compared with 64,299 tons for the same period a year ago.

Judson-Pacific Co. took 680 tons for a bridge over the Russian river in Mendocino county, California, and Moore Drydock Co. secured 275 tons for a bridge over the same river in Sonoma county, California. Three spillway gates for Pine Canyon dam, Pasadena, Calif., went to Western Pipe & Steel Co., 225 tons. Unnamed interests booked 134 tons for a bridge in Kit Carson county, Nevada, for the state. Over 16,000 tons are up for figures or pending. Bids were opened on 658 tons for a crossing in San Bernardino county, California, for the state. Wide flange material holds at 2.35c, f.o.b. cars, dock.

New Prices are Firm

Seattle—Pacific Northwest iron and steel markets are firm on the basis of the new prices. Improved conditions are noted in the jobbing trade, operating under a tentative code yet to be officially approved.

Seattle will again open bids Oct. 23 for the seawall improvement involving about 6500 tons of steel sheet piling, cast iron pipe, shapes and reinforcing. Bureau of reclamation will receive tenders at Ontario, Oreg., Oct. 25, for another unit of the Owyhee project, involving 175 tons of reinforcing, gates and other auxiliaries. Winston Bros. and G. F. Atkinson, contractors for the south Columbia river jetty, Porter building, Portland, Oreg., are taking bids on approximately 1000 tons of 75-pound relaying rails, several hundred tons of bolts, nuts and bents. Alaska Road commission called new bids Oct. 5 for six bridges in Alaska, 300 tons of shapes. Johnson Bros., Seattle, are low at $79,600 for the Felts Field hangar, Spokane, requiring 208 tons of shapes. Nearly 4000 tons of structurals are involved in the navy yard machine shop, bids Oct. 9.

Steel in Europe

Market Expansion Continues; World Buying More Steel

London—(*By Cable*)—Conditions in many departments of the steel and iron industry are improving considerably. Pig iron is being shipped to Denmark and Italy. Middlesbrough semifinished and constructional steelworks activity is maintained, but shipbuilding is low. The home market for galvanized sheets is good but exports are quiet. In the Midlands, improvement is being maintained. Order books of semifinished steel producers have substantial forward business into next year. Scottish trade is fairly steady and the South Wales tin plate trade is much improved.

Little change is reported from the Continent, but the outlook is slightly brighter. Export trade is mainly with the Near East, Far East and the Argentine.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 5

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON		£ s d		£ s d
Foundry, 2.50-3.00 Silicon	$13.89	2 18 6	$8.27	1 14 0
Basic bessemer	12.83	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	14.01	2 19 0	....	.....
SEMIFINISHED STEEL				
Billets	$24.94	5 5 0	$11.44	2 7 0
Wire rods, No. 5 gage	35.63	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$36.81	7 15 0	$26.77	5 10 0
Merchant bars	1.43c	6 15 0	.66c	3 0 0
Structural shapes	1.56c	7 7 6	.61c	2 15 0
Plates, †¼ in. or 5 mm	1.75c	8 5 0	.86c	3 18 6
Sheets, black, 24 gage or 0.5 mm.	1.96c	9 5 0	1.27c	5 15 0
Sheets, gal., 24 gage, corr.	2.39c	11 5 0	1.54c	7 0 0
Bands and strips	1.64c	7 15 0	.83c	3 15 0
Plain wire, base	1.86c	8 15 0	1.18c	5 7 6
Galvanized wire, base	2.23c	10 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.54c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 3.98	0 16 9	....	.....

British ferromanganese $82 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$14.84	3 2 6(a)	$12.99	215	$13.18	205	$23.12	63
Basic bessemer pig iron	14.01	2 19 0(a)*	11.78	195	12.53	290	25.51	69.50
Furnace coke	3.21	0 13 6	6.16	120	4.75	110	7.06	19.25
Billets	24.94	5 5 0	24.46	405	19.01	440	35.42	96.50
Standard rails	1.75c	8 5 0	1.89c	700	2.20c	1,100(b)	2.19c	132
Merchant bars	1.46c	6 17 6	1.51c	560	1.07c	535	1.83c	110
Structural shapes	1.86c	8 15 0	1.49c	550	1.07c	535	1.78c	107.50
Plates, †¼-in. or 5 mm.	1.80c	8 10 0	.49c	180	1.35c	675	2.11c	127
Sheets, black	2.12c	10 0 0§	2.30c	850‡	1.50c	750‡	2.39c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.65c	12 10 0	3.92c	1,450	2.90c	1,450	6.14c	370
Plain wire	1.86c	8 15 0	3.05c	1,130	2.60c	1,300	2.94c	177
Bands and strips	2.01c	9 10 0	1.67c	620	1.35c	675	2.11c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January

Warehouse

Price Adjustment Deferred Until Code Is Ratified

Pittsburgh — Prices of heavy hot-rolled products remain unchanged, the schedule as of Aug. 9 being the last revision. Important independent warehouse interests availed themselves of mill contracts covering their fourth quarter steel needs at the third quarter market. Warehouses still quote 3.20c here on cold-drawn. On nails decision was made recently to quote the warehouse, or less carload rate, $2.40 per keg. Black annealed wire is now 2.50c and galvanized wire, 2.60c.

Cleveland—While warehouse interests anticipate price revisions shortly, in accordance with recent advances in mill quotations, currently the markets are unchanged, but strong. The volume of business shows little change, with orders fairly numerous, though small.

Chicago — Sales are steady and jobbers look for a rising trend over the remainder of October. Bars at 2.75c and plates and shapes at 3.00c are unchanged, with increases in these figures later in the quarter expected. Other quotations also are unchanged.

New York — Galvanized sheets have been advanced $5 a ton by New York district jobbers, to 4.25c, with a 50-cent extra for broken bundles, effective Oct. 9. Black and blue annealed are unchanged, but in the case of the former a 50-cent extra on broken bundles applies. Warehouse volume is holding up well.

Philadelphia—Warehouse buying is about comparable with the September rate, which in turn was about 15 per cent under August. Prices generally are steady, although an advance may follow the contemplated increase of $3 in mill prices on cold-finished bars. No change in warehouse prices is expected as a result of the recent increase at the mills on plates, shapes and commercial bars.

Detroit—Warehouse business in Detroit in September was an improvement over August, but unsettled conditions, partly due to strikes, obscures the outlook for October. No changes in prices are noted.

Cincinnati—Demand from warehouse is steady. Changes following mill advances are delayed. Cold-finished steel is now 3.55c, off 2 cents, on an adjustment.

St. Louis—Slight acceleration in business is noted by iron and steel warehouses. Seasonal demand is appearing, and certain sections of the general manufacturing trade show considerable life.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore*	2.60c
Boston††	2.65c
Buffalo	2.95c
Chattanooga	3.05c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.40c
Los Ang.	3.30c
New Orleans	3.00c
New York‡ (d)	3.10c
Philadelphia*	2.60c
Pittsburgh	2.60c
Portland	3.15c
San Fran.	3.30c
Seattle	3.30c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Baltimore*	2.60c
Boston	3.25c
Chattanooga	3.05c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia*	2.60c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS

Baltimore	2.35c-3.00c
Boston	2.75c-3.25c
Buffalo	1.95c
Chattanooga	3.05c
Cincinnati	3.00c
Cleveland	2.00c-2.45c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	3.00c
New Orleans	3.00c
New York	2.65c-3.10c
Phila.	2.62½c
Pittsburgh	2.60c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	2.60c
Boston††	2.75c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	2.65c
Los Ang.	3.30c
New Orleans	3.50c
New York(d)	3.10c
Philadelphia*	2.60c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.30c
Seattle	3.30c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	2.60c
Boston††	2.75c
Buffalo	3.20c
Chattanooga	3.30c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼ in. and thicker	2.95c
Cleve., 3/16-in	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New Orleans	3.50c
New York (d)	3.30c
Philadelphia*	2.60c
Phila. floor	4.35c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	3.30c
Seattle	3.30c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	2.75c
Boston††	2.65c
Buffalo	3.10c
Chattanooga	3.50c
Chicago	2.85c
Cincinnati	3.05c
Cleveland	2.75c
Det., 8-10 ga.	2.90c
Houston	3.35c
Los Ang.	3.45c
New Orleans	3.50c
New York	3.00c
Portland	3.75c
Philadelphia*	2.75c
Pitts.**	2.85c
San Fran.	3.53c
Seattle	3.75c
St. Louis	3.10c-3.25c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Balt.*†	3.50c
Boston††	3.75c
Buffalo	3.25c
Chattanooga	4.00c
Chicago	3.45c
Cincinnati	3.60c
Cleveland	3.25c
Detroit	3.30c
Los Ang.	4.05c
New York	3.65c
Philadelphia*†	3.30c
Pitts.**	3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.15c
St. Louis	3.60c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Balt.*†	3.75c
Buffalo	4.00c
Boston††	4.25c
Chattanooga	4.25c
Chicago	4.00c-4.10c
Cincinnati	4.15c
Cleveland	3.85c
Detroit	3.85c
Houston	3.57c
Los Ang.	4.65c
New Orleans	4.25c
New York	4.25c
Pitts.**	3.75c-4.00c
Portland	5.00c
San Fran.	4.75c
Seattle	4.75c
St. Louis	4.25c
St. Paul	4.19c
Tulsa	5.10c
Philadelphia*†	3.75c

†BANDS

Baltimore	2.90c
Boston††	3.15c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	2.85c
Los Ang.	3.80c
New Orleans	3.20c
New York(d)	3.30c
Philadelphia	2.90c
Pittsburgh	2.95c
Portland	3.65c
San Fran.	3.15c
Seattle	3.65c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.20c

†HOOPS

Baltimore	2.80c
Boston	4.90c
Buffalo	3.55c
Chicago	3.50c
Cincinnati	3.75c
Det. No. 14 & lighter	3.65c
New York	3.30c
Philadelphia	3.15c
Pittsburgh	3.60c
Seattle	5.15c
St. Paul	3.75c

COLD FIN. STEEL

Baltimore (c)	3.33c
Boston (g)	3.70-4.20c
Buffalo	3.25c
Chattanooga*	3.90c
Chicago	3.25c
Cincinnati	3.55c
Clevel'd, flats	3.40c
Do., rounds squares, hexagons	3.25c
Detroit	3.40c
Los Ang.	5.85c
New Orleans	4.25c
New York	3.79c
Philad. (c)	3.35c
Pittsburgh	3.20c
Portland (f)	4.50c
San Fran. (d)	5.85c
Seattle (f)	4.50c
St. Paul	3.20c
St. Louis	3.61c
Tulsa	4.65c

COLD ROLL. STRIP

Boston 0.100 in., 500 lb lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(a) Rounds, hex, only.
(b) Net base straightening, cutting boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) Bessemer analysis extras not included

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.

†New extras apply.

††Base 40,000 lbs., extras on less.

Prices at Detroit, Cleveland, New York, Chicago, Pittsburgh Cincinnati, Chattanooga and St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 3999 pounds, base; 4000 to 7999 pounds, 15 cents off; 8000 to 14,999 pounds, 30 cents off; 15,000 to 39,999 pounds, 50 cents off; 40,000 pounds and over, 60 cents off.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 9.00c, Conn., for copper

Sheets	
Yellow brass (high)	14.75
Copper, hot rolled	17.12½
Lead sheets, cut to jobbers	8.25
Zinc sheets (100-lb. base)	9.00
Tubes and Pipes	
Seamless yellow brass (high)	16.37½
Seamless copper	16.62½
Rods	
Yellow brass (high, full turnings)	12.25
Naval brass	13.37½
Anodes	
Copper, untrimmed	14.50
Wire	
Yellow brass (high)	14.75

Old Metals

Dealers' buying prices, cents lb

No. 1 Composition Red Brass	
New York	5.00 to 5.25
Chicago	4.62½ to 4.87½
Cleveland	5.50 to 5.75
St. Louis	4.50 to 4.75
Heavy Yellow Brass	
New York	3.75 to 4.00
Heavy Copper and Wire	
New York	6.75 to 7.00
Chicago, No. 1	6.00 to 6.50
Cleveland	5.75 to 6.50
St. Louis	5.25
Composition Brass Borings	
New York	4.75 to 5.00
Yellow Brass Tubing	
Cleveland	4.00 to 4.25
Light Copper	
New York	5.50 to 5.75
Chicago	4.75 to 5.25
Cleveland	5.25 to 5.75
St. Louis	5.00
Light Brass	
Chicago	3.00 to 3.25
Cleveland	3.00 to 3.50
St. Louis	2.75 to 3.00
Lead	
New York	3.50 to 3.62½
Cleveland	3.00 to 3.50
Chicago	3.12½ to 3.37½
St. Louis	3.25 to 3.50
Zinc	
New York	2.25 to 2.50
Cleveland	2.25 to 2.75
Chicago	2.50 to 2.75
St. Louis	2.75 to 3.00
Aluminum	
Clippings, new, soft, Cleve.	13.00 to 14.00
Borings, Cleveland	5.25 to 5.75
Mixed cast, Cleveland	8.25 to 8.50
Mixed cast, St. Louis	8.00 to 8.50

Secondary Metals

Brass ingot, 85-5-5-5	9.00
Remelt aluminum No. 12	12.50 to 13.25

Metals

Shading Heard in Copper but Lead and Zinc Remain Firm—Tin Reaches 49-cent Level

New York—Tone of the nonferrous metal market was quiet last week but prices remained generally steady with the exception of reported price cutting in copper. The trade appeared to be waiting the outcome of trade practice codes, a number of which still have not been completed for final hearing in Washington.

Copper—The market was disturbed by the report that business has been done quietly at 8.75c, Connecticut, by one first-hand seller. Rumors still were current at the close of last week that bids at 8.75c would be accepted but no actual business at less than 9.00c was disclosed. Resale copper, however continued available at the usual ¼-cent concession. Copper shipments to consumers are reported to be holding up well although under the September volume. Movement of copper and brass products also is in good volume but new business has slackened.

Lead—Sales were light last week compared with the previous period. However, sales for October delivery already are close to the September total and a further reduction in surplus stocks is said to be in prospect. With the statistical position of lead showing marked improvement, the prospects for a stronger market in the near future are said to be favorable. At present, however, low foreign prices are preventing a rise here. Moderately higher prices here would result in the diversion of foreign ore to this country.

Zinc—Demand appeared quiet on the surface but a substantial volume of business was thought to have been done quietly. Prices were firm with a strong ore market a supporting factor. High grade sellers again were quoting at the usual 1 cent differential over prime western.

Tin—Higher prices in London and the appearance of favorable statistics resulted in a further advance in this country. Straits metal hit the 49-cent level for the first time in several years. Demand subsided as prices advanced, however, and the market on most days was purely nominal.

Antimony — The market eased slightly and demand continued dull.

Distillates Firm, Active

New York—Shipments of toluol, benzol and xylol are active, there being little spot supply available. Chemical and industrial consumers are active. Prices are firm and unchanged. Strikes in the coal and coke regions have had some influence on supplies, but the full extent of this situation is not expected to be felt until later. Prices for other by-products are unchanged, with a fair spot demand prevailing.

Coke By-Products

Per Gallon Producers' Plants, Tank Lots	Spot
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.153 to 0.173
Per Pound at Producers' Plants	
Naphthalene flakes	4.75 to 5.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.20

Quicksilver Quiet

New York—Quicksilver prices are steady, following the recent advance. Round lots are $66 to $67, a virgin flask of 76 pounds. The market is quiet. Imports of quicksilver during the first seven months of this year were 569,785 pounds, valued at $233,895.

Nonferrous Metal Prices of the Week, Cents a Pound

Spot unless otherwise specified

	Copper			Straits Tin		Lead	Lead	Zinc	Aluminum	Antimony	Ingot Nickel
	Electro., del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	New York Futures	N. Y.	East St. L.	St. L.	98-99%	Spot, N. Y.	
Sept. 30	9.00	9.12½	8.75	48.30	48.55	4.50	4.35	4.75	*22.90	7.00	35.00
Oct. 2	9.00	9.12½	8.75	48.87½	49.25	4.50	4.35	4.75	*22.90	6.87½	35.00
Oct. 3	9.00	9.12½	8.75	48.50	48.87½	4.50	4.35	4.75	*22.90	6.87½	35.00
Oct. 4	9.00	9.12½	8.75	48.75	49.12½	4.50	4.35	4.75	*22.90	6.87½	35.00
Oct. 5	9.00	9.12½	8.75	49.00	49.37½	4.50	4.35	4.75	*22.90	6.87½	35.00
Oct. 6	9.00	9.12½	8.75	48.87½	49.25	4.50	4.35	4.75	*22.90	6.87½	35.00

*Nominal quotation. Market range 19.90c to 22.90c.

Construction and Enterprise

New York

NEW YORK—Benson Metal Products Co. Inc. has been incorporated with 200 shares no par value to manufacture gas pilots and lighters, by Emil Leepson, 70 Pine street, New York.

New Jersey

NEWARK, N. J.—Interstate Iron Works Inc. has been incorporated with 2500 shares no par value to manufacture iron products, by Herman E. Densker, Newark, N. J.

Ohio

DAYTON, O.—Dayton Iron & Metal Co. Inc. has been incorporated with 250 shares no par value to operate a waste metal business, by Wolfe W. Marcus, 306 Keith Theater building, Dayton, O.

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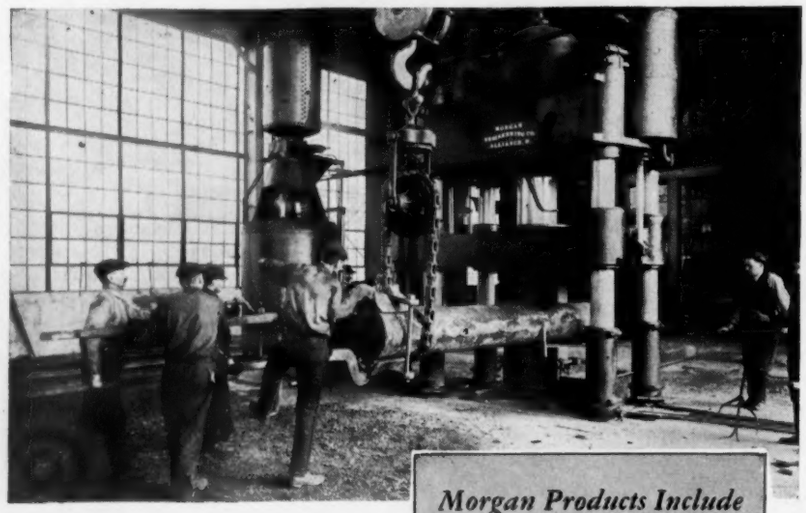

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Michigan

BAY CITY, MICH.—Valley Welding & Boiler Co., 1317 South Water street, has been incorporated with $3000 capital to do a general welding business, by John J. Hebert, 208 Stanton street, Bay City, Mich.

DEARBORN, MICH.—Conra Steel Co. has been incorporated with $1000 capital, by C. E. Conover, 9747 Brandt street, Dearborn, Mich.

DETROIT—Metal Bi-Products Co. Inc., 648 East Columbia street, has been incorporated with $10,000 capital to smelt and refine metals, by M. Marx, 3010 West Chicago boulevard, Detroit.

DETROIT—American Iron & Metal Co., 4690 Humboldt street, has been incorporated with $1000 capital to prepare and deal in iron and other metals, by Simon Ginsburg, 2944 Tuxedo avenue, Detroit.

DETROIT—Huck Mfg. Co., 6527 Russell street, has been incorporated with 1000 shares no par value to manufacture cold-flowing rivets, by Louis C. Huck, 541 Lincoln road, Grosse Pointe, Mich.

GRAND HAVEN, MICH.—Hamilton & Weber, architects, Grand Rapids, Mich., are making plans for alterations and extensions to the present municipal light and power plant here, cost estimated at $100,000.

Illinois

CHICAGO—Modern Plating Co., 3029 North Rockwell street, has been incorporated with 100 shares capital to manufacture plated metal products, by Emil Van Steenkiste, 3029 North Rockwell street.

CHICAGO — Accurator Corp., 231 South LaSalle street, has been incorporated with 5000 shares no par value to manufacture computing machines, by Thomas G. Deering, 208 South LaSalle street.

CHICAGO—Economy Automatic Bottle Loader Co., 1 North LaSalle street, suite 2414, has been incorporated with 100 shares no par value to manufacture machinery, by Louis A. Cohan, 1 North LaSalle street.

CHICAGO—General Brass Foundry Corp., 1364 West Randolph street, has been incorporated with 20 shares capital stock to manufacture metal castings, by William J. Cerny, 139 North Clark street, suite 1015.

Southern States

LOUISVILLE, KY.—Taylor & Williams Inc., J. B. Dant president, 1479 South Fourth street, plans construction of a distillery on a 20-acre tract on Seventh street road, to cost about $250,000. Leslie V. Abbott, 8 Kenwood Village, Louisville, Ky., is architect.

Oklahoma

OKLAHOMA CITY, OKLA.—Royal Refining Co. has been incorporated with $5000 capital to operate an oil refinery, by Buford Long, care Chamber of Commerce.

TULSA, OKLA.—Precision Cylinder

Grinding Works has been incorporated with $5000 capital to operate a machine shop, by W. E. Gardner, 10 East Eleventh street, Tulsa, Okla.

Texas

BEAUMONT, TEX.—Sun Pipe Line Co. plans construction of an oil pipe line from Humble, Tex., to the Conroe field, 17 miles, probably 6-inch pipe. R. W. Pack is vice president and general manager, in charge.

KILGORE, TEX.—Owl Refining Co. has been incorporated with $3000 capital to operate an oil refinery, by William J. Gerron, president.

HOUSTON, TEX.—Electric Mfg. & Distributing Co. has been organized at 1203 Caroline street to manufacture electrical specialties. Ben Streusland is secretary and treasurer.

HOUSTON, TEX.—Empire Iron & Metal Co., Nathan Gitler manager, has established a yard and office at 3702 Harrisburg boulevard.

HOUSTON, TEX.—Humason & Co. has been incorporated with $1000 capital to manufacture oilfield tools, by G. A. Humason, 3019 Hamilton street, Houston, Tex.

Wisconsin

MENASHA, WIS.—Millard Hoop Mfg. Co. has been organized and has leased an idle plant to manufacture cooperage hoops of strip and wire.

MILWAUKEE—Plant of the South Side Malleable Casting Co., 2700 South Nineteenth street, damaged by fire several months ago, will be rehabilitated at once. Klug & Smith Co., 111 East Wisconsin avenue, Milwaukee, will handle the work as engineers and contractors.

WAUKESHA, WIS.—Weber Brewing Co. will spend $75,000 to $100,000 to convert the former Waukesha Dairy Co. plant on North street into a brewing and malting plant requiring new machinery and equipment throughout. Kilian Weber is general manager.

PORT WASHINGTON, WIS.—Old Port Brewing Co. is preparing to build additions and install new machinery and equipment at estimated cost of $50,000. Herbert LaBahn is president.

Pacific Coast

COMPTON, CALIF.—Board of city trustees, James H. Park city manager, plans construction of a municipal electric light and power plant to cost about $250,000. A gas plant to cost about the same sum is also under consideration.

LOS ANGELES—Nelli Art Bronze Foundry, Guido Nelli, manager, 2213 Garnet street, is preparing to build a new plant at 3426 Union Pacific avenue, from plans by Arthur W. Hawes, 1047 South Orange Grove avenue, Los Angeles. (Noted Aug. 8 as located at 2313 Garnet street.)

MOJAVE, CALIF.—Mojave Smelting Co., Reno, Nev., plans an electric and steam power plant at its new smelter here, the entire program to cost about $200,000.

PORTLAND, OREG.—The President has authorized immediate allocation of $20,000,000 of the $31,000,000 needed for construction of the Bonneville Power project, involving two power units with capacity for 90,000 kilowatts. Navigation improvement and flood control are included. Major C. F. Williams, district engineer, Portland, Oreg., is in charge.

KELSO, WASH.—Commissioners of Cowlitz county have awarded to the Worthington Co. Inc., Seattle, a contract for two pumps to replace equipment damaged in a recent dike break.

TACOMA, WASH.—Tacoma Narrows Bridge Co., sponsoring the proposed Narrows structure, has presented revised plans which will be considered by United States engineers. Plans show a center span 1120 feet long and vertical clearance of 196 feet at low water.

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Statement of the ownership, management, circulation, etc., required by the act of congress of Aug. 24, 1912, of STEEL published weekly at Cleveland, Ohio, for Oct. 1, 1933. State of Ohio, County of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who having been duly sworn according to law, deposes and says that he is the Business Mgr. of STEEL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, embodied in section 411, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Penton Publishing Co., Cleveland, O., Editor, E. L. Shaner, Cleveland, O., Managing Editor, E. C. Barringer, Cleveland, O., Business Mgr., Geo. O. Hays, Cleveland, O. 2.—That the owners are: Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Penton Publishing Company, Cleveland, Ohio; John A. Penton, Cleveland, O.; C. J. Stark, Cleveland, O.; J. D. Pease, Cleveland, O.; F. V. Cole, Cleveland, O.; J. R. Dawley, Cleveland, O. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4.—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stocks, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me this 25th day of September, 1933. (Seal) H. L. Richey. (My commission expires May 7, 1936.)